

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

C204181

CONTRACT AND
CONTRACT BONDS

FOR CONTRACT NO. C204181

WBS 34446.3.4 STATE FUNDED

T.I.P NO. R-2530B

COUNTY OF STANLY, MONTGOMERY

THIS IS THE ROADWAY & CULVERT CONTRACT

ROUTE NUMBER NC 24 LENGTH 6.908 MILES

LOCATION NC-24/27 FROM NC 740 (SPAULDING ST) IN ALBERMARLE TO EAST OF
THE PEE DEE RIVER.

CONTRACTOR BLYTHE DEVELOPMENT CO
ADDRESS 1415 E WESTINGHOUSE BLVD
CHARLOTTE, NC 282735801

BIDS OPENED OCTOBER 15, 2019

CONTRACT EXECUTION 10/25/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH, N.C.

PROPOSAL

INCLUDES ADDENDUM No.2 DATED 10-08-2019

DATE AND TIME OF BID OPENING: **OCTOBER 15, 2019 AT 2:00 PM**

CONTRACT ID C204181
WBS 34446.3.4

FEDERAL-AID NO. STATE FUNDED
COUNTY STANLY, MONTGOMERY
T.I.P. NO. R-2530B
MILES 6.908
ROUTE NO. NC 24
LOCATION NC-24/27 FROM NC 740 (SPAULDING ST) IN ALBERMARLE TO EAST OF
THE PEE DEE RIVER.
TYPE OF WORK GRADING, DRAINAGE, PAVING, SIGNALS, CULVERTS, AND RETAINING
WALL.

NOTICE:

ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.

BIDS WILL BE RECEIVED AS SHOWN BELOW:

THIS IS A ROADWAY & CULVERT PROPOSAL

5% BID BOND OR BID DEPOSIT REQUIRED

**PROPOSAL FOR THE CONSTRUCTION OF
CONTRACT No. C204181 IN MONTGOMERY AND STANLY COUNTIES, NORTH CAROLINA**

Date _____ 20 _____

**DEPARTMENT OF TRANSPORTATION,
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. **C204181** has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Board of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. **C204181** in **Montgomery and Stanly Counties**, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

Accompanying this bid is a bid bond secured by a corporate surety, or certified check payable to the order of the Department of Transportation, for five percent of the total bid price, which deposit is to be forfeited as liquidated damages in case this bid is accepted and the Bidder shall fail to provide the required payment and performance bonds with the Department of Transportation, under the condition of this proposal, within 14 calendar days after the written notice of award is received by him, as provided in the *Standard Specifications*; otherwise said deposit will be returned to the Bidder.



State Contract Officer

DocuSigned by:

Ronald E. Davenport, Jr.

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TABLE OF CONTENTS**COVER SHEET
PROPOSAL SHEET****PROJECT SPECIAL PROVISIONS**

CONTRACT TIME AND LIQUIDATED DAMAGES:	G-1
INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:	G-1
INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:	G-2
AWARD OF CONTRACT:.....	G-3
PERMANENT VEGETATION ESTABLISHMENT:.....	G-3
MAJOR CONTRACT ITEMS:	G-4
SPECIALTY ITEMS:	G-4
SPECIAL REQUIREMENTS FOR WORK IN NATIONAL FOREST:	G-4
FUEL PRICE ADJUSTMENT:	G-7
PAYOUT SCHEDULE:	G-8
SCHEDULE OF ESTIMATED COMPLETION PROGRESS:.....	G-8
MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:	G-8
CONTRACTOR'S LICENSE REQUIREMENTS:	G-24
USE OF UNMANNED AIRCRAFT SYSTEM (UAS):	G-24
SUBSURFACE INFORMATION:.....	G-24
PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):.....	G-24
REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):.....	G-25
MAINTENANCE OF THE PROJECT:	G-25
COOPERATION BETWEEN CONTRACTORS:.....	G-25
ELECTRONIC BIDDING:.....	G-26
BID DOCUMENTATION:	G-26
TWELVE MONTH GUARANTEE:	G-30
OUTSOURCING OUTSIDE THE USA:	G-30
EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:	G-31
PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:.....	G-36
ROADWAY.....	R-1

STANDARD SPECIAL PROVISIONS

AVAILABILITY FUNDS – TERMINATION OF CONTRACTS	SSP-1
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY	SSP-2
ERRATA.....	SSP-5
PLANT AND PEST QUARANTINES	SSP-6
MINIMUM WAGES	SSP-7
TITLE VI AND NONDISCRIMINATION	SSP-8
ON-THE-JOB TRAINING	SSP-16

UNIT PROJECT SPECIAL PROVISIONS

GEOTECHNICAL.....	GT-0.1
GEOENVIRONMENTAL.....	GV-1

TRAFFIC CONTROL	TC-1
UTILITY CONSTRUCTION	UC-1
UTILITY BY OTHERS.....	UBO-1
EROSION CONTROL	EC-1
FILTRATION BASIN	SW-1
TRAFFIC SIGNALS AND ITS.....	TS-1
STRUCTURE / CULVERTS.....	ST-1
<u>PERMITS</u>	P-1

PROPOSAL ITEM SHEET

ITEM SHEET(S) (TAN SHEETS)

PROJECT SPECIAL PROVISIONS**GENERAL****CONTRACT TIME AND LIQUIDATED DAMAGES:**

(8-15-00) (Rev. 12-18-07)

108

SP1 G07 A

The date of availability for this contract is **November 25, 2019**, except that work in jurisdictional waters and wetlands shall not begin until a meeting between the DOT, Regulatory Agencies, and the Contractor is held as stipulated in the permits contained elsewhere in this proposal. This delay in availability has been considered in determining the contract time for this project.

The completion date for this contract is **December 28, 2023**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Two Hundred Dollars (\$ 200.00)** per calendar day. These liquidated damages will not be cumulative with any liquidated damages which may become chargeable under Intermediate Contract Time Number 1.

INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:

(7-1-95) (Rev. 2-21-12)

108

SP1 G13 A

Except for that work required under the Project Special Provisions entitled *Planting, Reforestation* and/or *Permanent Vegetation Establishment*, included elsewhere in this proposal, the Contractor will be required to complete all work included in this contract and shall place and maintain traffic on same.

The date of availability for this intermediate contract time is **November 25, 2019**.

The completion date for this intermediate contract time is **July 1, 2023**.

The liquidated damages for this intermediate contract time are **Four Thousand Dollars (\$ 4,000.00)** per calendar day.

Upon apparent completion of all the work required to be completed by this intermediate date, a final inspection will be held in accordance with Article 105-17 and upon acceptance, the Department will assume responsibility for the maintenance of all work except *Planting, Reforestation* and/or *Permanent Vegetation Establishment*. The Contractor will be responsible for and shall make corrections of all damages to the completed roadway caused by his planting operations, whether occurring prior to or after placing traffic through the project.

INTERMEDIATE CONTRACT TIME NUMBER 2 AND LIQUIDATED DAMAGES:

(2-20-07)

108

SP1 G14 A

The Contractor shall complete the required work of installing, maintaining, and removing the traffic control devices for lane closures and restoring traffic to the existing traffic pattern. The Contractor shall not close or narrow a lane of traffic on **-L- (NC 24/27/73), -Y1- (NC 24/27/73/NC 740/Spaulding Street), or -Y16- (NC 73)** during the following time restrictions:

DAY AND TIME RESTICTIONS**Monday thru Friday****7:00 AM to 9:00 AM****and****4:00 PM to 6:00 PM**

In addition, the Contractor shall not close or narrow a lane of traffic on **-L- (NC 24/27/73), -Y1- (NC 24/27/73/NC 740/Spaulding Street), or -Y16- (NC 73)**, detain and/or alter the traffic flow on or during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

HOLIDAY AND HOLIDAY WEEKEND LANE CLOSURE RESTRICTIONS

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **7:00 AM** December 31st and **6:00 PM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday or Monday, then until **6:00 PM** the following Tuesday.
3. For **Easter**, between the hours of **7:00 AM** Thursday and **6:00 PM** Monday.
4. For **Memorial Day**, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.
5. For **Independence Day**, between the hours of **7:00 AM** the day before Independence Day and **6:00 PM** the day after Independence Day.

If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **7:00 AM** the Thursday before Independence Day and **6:00 PM** the Tuesday after Independence Day.
6. For **Labor Day**, between the hours of **7:00 AM** Friday and **6:00 PM** Tuesday.
7. For **Thanksgiving**, between the hours of **7:00 AM** Tuesday and **6:00 PM** Monday.
8. For **Christmas**, between the hours of **7:00 AM** the Friday before the week of Christmas Day and **6:00 PM** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that lane closures will not be required during these periods, unless otherwise directed by the Engineer.

The time of availability for this intermediate contract work shall be the time the Contractor begins to install all traffic control devices for lane closures according to the time restrictions listed herein.

The completion time for this intermediate contract work shall be the time the Contractor is required to complete the removal of all traffic control devices for lane closures according to the time restrictions stated above and place traffic in the existing traffic pattern.

The liquidated damages are **Five Hundred Dollars (\$ 500.00)** per fifteen (15) minute time period.

AWARD OF CONTRACT:

Revise the 2018 *Standard Specifications* as follows:

Page 1-23, Subarticle 103-4 (A) General, first paragraph, replace the 3rd and 4th sentences with the following:

Where award is to be made, the notice of award will be issued within 60 days after the opening of bids or upon issuance of any necessary debt instrument, whichever is later, but not to exceed 120 days; except with the consent of the lowest responsible bidder the decision to award the contract to such bidder may be delayed for as long a time as may be agreed upon by the Department and such bidder. In the absence of such agreement, the lowest responsible bidder may withdraw his bid at the expiration of 120 days without penalty if no notice of award has been issued.

PERMANENT VEGETATION ESTABLISHMENT:

(2-16-12) (Rev. 10-15-13)

104

SP1 G16

Establish a permanent stand of the vegetation mixture shown in the contract. During the period between initial vegetation planting and final project acceptance, perform all work necessary to establish permanent vegetation on all erodible areas within the project limits, as well as, in borrow and waste pits. This work shall include erosion control device maintenance and installation, repair seeding and mulching, supplemental seeding and mulching, mowing, and fertilizer topdressing, as directed. All work shall be performed in accordance with the applicable section of the *2018 Standard Specifications*. All work required for initial vegetation planting shall be performed as a part of the work necessary for the completion and acceptance of the Intermediate Contract Time (ICT). Between the time of ICT and Final Project acceptance, or otherwise referred to as the vegetation establishment period, the Department will be responsible for preparing the required National Pollutant Discharge Elimination System (NPDES) inspection records.

Once the Engineer has determined that the permanent vegetation establishment requirement has been achieved at an 80% vegetation density (the amount of established vegetation per given area to stabilize the soil) and no erodible areas exist within the project limits, the Contractor will be notified to remove the remaining erosion control devices that are no longer needed. The Contractor will be responsible for, and shall correct any areas disturbed by operations performed in permanent vegetation establishment and the removal of temporary erosion control measures, whether occurring prior to or after placing traffic on the project.

Payment for *Response for Erosion Control, Seeding and Mulching, Repair Seeding, Supplemental Seeding, Mowing, Fertilizer Topdressing, Silt Excavation, and Stone for Erosion Control* will be made at contract unit prices for the affected items. Work required that is not represented by

contract line items will be paid in accordance with Articles 104-7 or 104-3 of the *2018 Standard Specifications*. No additional compensation will be made for maintenance and removal of temporary erosion control items.

MAJOR CONTRACT ITEMS:

(2-19-02)

104

SP1 G28

The following listed items are the major contract items for this contract (see Article 104-5 of the *2018 Standard Specifications*):

Line #	Description
0006 —	Unclassified Excavation
0009 —	Borrow Excavation
0084 —	Asphalt Concrete Base Course, Type B25.0 C
0085 —	Asphalt Concrete Intermediate Course, Type I19.0 C
0087 —	Asphalt Concrete Surface Course, Type S9.5 C
0209 —	12" Water Line

SPECIALTY ITEMS:

(7-1-95)(Rev. 1-17-12)

108-6

SP1 G37

Items listed below will be the specialty items for this contract (see Article 108-6 of the *2018 Standard Specifications*).

Line #	Description
139-149	Guardrail
150	Fencing
155-166	Signing
184-189, 202	Long-Life Pavement Markings
190	Removable Tape
203-204	Permanent Pavement Markers
205-257	Utility Construction
258-303	Erosion Control
304-341	Signals/ITS System

SPECIAL REQUIREMENTS FOR WORK IN NATIONAL FOREST:

(7-1-95)

107-13

SP1 G40

In addition to other requirements in this proposal with respect to clearing, erosion control, protection of environment, etc., comply with the following requirements:

- (A) Comply with the portions of these Special Requirements, entitled "Fire Plan," "Clearing Plan," and "Landscape and Erosion Control Plan." Note the fact that merchantable timber within Forest Service Property will become the property of the Contractor.
- (B) Comply with the following recommendations of the State Fish and Game Department and Forest Service for wildlife and fish management:
 - (1) Take all necessary precautions to avoid damage to fish habitat and exercise every reasonable precaution to prevent muddying or silting live streams.

- (2) Do not deposit material removed from the roadway or channel changes in live streams or into the streams or stream channel where it would be washed away by high stream flows.
- (3) Do not haul materials, including logs, brush, and debris, by fording live streams. Instead, provide temporary bridges or other structures for this purpose.
- (C) Dispose of waste material resulting from slides during construction and surplus material at locations approved by the Forest Supervisor. Submit a plan showing the proposed method of disposal at the time approval is requested.
- (D) Treat sections of existing road to be abandoned as a result of the proposed new construction, as designated by the Forest Supervisor, to restore them to their natural state. The necessary treatment will be determined during a joint review between the Forest Service and the State and may include ripping of roadbed, removal of drainage structure, and opening drainage channels. Plans and specifications as mutually deemed appropriate to accomplish the objective will become a part of this stipulation.
- (E) Permanently monument the right of way prior to completion of construction in accordance with State requirements for such right of way, but in any event the minimum requirements will be to place permanent monuments at the intersection of right of way with all property lines, section lines, and at intervals of not more than 1,000 feet along the right-of-way limits.
- (F) Re-establish or restore public land monuments disturbed or destroyed by construction, reconstruction, or maintenance according to instructions of the Bureau of Land Management, Department of the Interior. Do not damage, destroy, or obliterate other land monuments and property corners or witness markers without the prior permission of the Regional Forester. Relocate or re-establish these land monuments, property corners, and witness markers in accordance with standards satisfactory to the Regional Forester.

Fire Protection Plan

During the period of construction, perform both independently and in cooperation with the Forest Service everything that is reasonable and practical to prevent and suppress forest fires on the easement area and in its immediate vicinity. Include provisions in all subcontracts for the construction of the road requiring subcontractors and their respective employees to do likewise. The contractors and subcontractors, shall conform to, but not be limited to, the following Fire Plan:

- (A) Take immediate independent or cooperative action to control and extinguish any fire, regardless of cause, within the easement area and its vicinity.
- (B) Maintain at readily available sites one or more boxes of firefighting tools to be furnished by the Forest Service for forest fire fighting purposes only.
- (C) Perform debris burning only in the center of the right of way, and only after a strip 20 feet wide around each pile is cleared to mineral soil.

- (D) Keep fires compact by throwing in the larger material as it burns. If piles are too close together or burn hot, light every second or third pile; allow these to cool down before firing the others. On slopes start burning at the top and work down. Confine fires to piles at all times.
- (E) Do not leave fires unattended.
- (F) Discontinue burning upon notification by the District Forest Ranger or his representative that fire danger is such that there is abnormal risk.
- (G) Whenever a fire escapes, notify the District Ranger immediately even if the fire is suppressed without Forest Service assistance.
- (H) The contractor or subcontractor responsible will bear the costs, including Forest Service direct costs and value of resources damages, incurred by the Forest Service in controlling and extinguishing any fire on or threatening National Forest lands which they or their employees caused with or without negligence in connection with construction operations.
- (I) Contact the District Ranger 24 hours in advance of burning.

Clearing Plan

Conform to the following clearing plan:

- (A) Dispose of unmerchantable materials including tops, branches, etc., by piling and burning as directed by the Forest Service or used in brush barriers. Alternate methods of disposal, including any of the following methods or combinations of methods (lop and scatter, chip, remove, pile only), shall be approved in advance by the Forest Service.
- (B) The maximum clearing and grubbing limits are to be as shown on the plans except that cutting of hazard trees outside these limits may be done with approval. Confine construction machinery within the clearing limits.

Landscape and Erosion Control Plan

The erosion control plan will be designed and implemented to prevent visible sediment, as defined by NC DEQ regulations, from reaching any defined stream channel.

Conform to, but not be limited to, the following Landscape and Erosion Control Plan.

- (A) Prevent visible sediment from entering any stream channel. If an erosion control practice must be sited in a channel, it shall stop further down-channel transport of visible sediment.
- (B) Bear responsibility for the prevention and control of soil erosion and gully on the right of way and lands adjacent thereto resulting from the construction or maintenance of the road. Revegetate with grass (not Love Grass) or herbaceous plants all ground where the

soil has been exposed. Accomplish revegetation within 20 working days following final grading.

- (C) Round the ends of cut sections and the tops of back slopes.
- (D) Vegetate all front and back slopes by liming, fertilizing, mulching and seeding; including any waste area. Mulch critical areas if they are to be exposed greater than 5 working days of probable inclement weather during seasons when seeding is impracticable. Critical areas include all bare soils within 100 feet (slope distance) of perennial and intermittent streams. Mulch these as soon as practical and after final seeding.
- (E) Maintain all erosion control practices in a timely manner to prevent visible sediment from entering any stream channel, until such time that the final revegetation stabilizes the site and prevents erosion and off-site movement of sediment.

FUEL PRICE ADJUSTMENT:

(11-15-05) (Rev. 2-18-14)

109-8

SP1 G43

Revise the *2018 Standard Specifications* as follows:

Page 1-87, Article 109-8, Fuel Price Adjustments, add the following:

The base index price for DIESEL #2 FUEL is \$ **1.9948** per gallon. Where any of the following are included as pay items in the contract, they will be eligible for fuel price adjustment.

The pay items and the fuel factor used in calculating adjustments to be made will be as follows:

Description	Units	Fuel Usage Factor Diesel
Unclassified Excavation	Gal/CY	0.29
Borrow Excavation	Gal/CY	0.29
Class IV Subgrade Stabilization	Gal/Ton	0.55
Aggregate Base Course	Gal/Ton	0.55
Sub-Ballast	Gal/Ton	0.55
Asphalt Concrete Base Course, Type ____	Gal/Ton	2.90
Asphalt Concrete Intermediate Course, Type ____	Gal/Ton	2.90
Asphalt Concrete Surface Course, Type ____	Gal/Ton	2.90
Open-Graded Asphalt Friction Course	Gal/Ton	2.90
Permeable Asphalt Drainage Course, Type ____	Gal/Ton	2.90
Sand Asphalt Surface Course, Type ____	Gal/Ton	2.90
Aggregate for Cement Treated Base Course	Gal/Ton	0.55
Portland Cement for Cement Treated Base Course	Gal/Ton	0.55
__" Portland Cement Concrete Pavement	Gal/SY	0.245
Concrete Shoulders Adjacent to __" Pavement	Gal/SY	0.245

PAYOUT SCHEDULE:

(1-19-10) (Rev. 1-17-12)

108

SP1 G57

Submit an Anticipated Monthly Payout Schedule prior to beginning construction. The Anticipated Monthly Payout Schedule will be used by the Department to monitor funding levels for this project. Include a monthly percentage breakdown (in terms of the total contract amount) of the work anticipated to be completed. The schedule should begin with the date the Contractor plans to begin construction and end with the anticipated completion date. Submit updates of the Anticipated Monthly Payout Schedule on March 15, June 15, September 15, and December 15 of each calendar year until project acceptance. Submit the original Anticipated Monthly Payout Schedule and all subsequent updates to the Resident Engineer with a copy to the State Construction Engineer at 1 South Wilmington Street, 1543 Mail Service Center, Raleigh, NC 27699-1543.

SCHEDULE OF ESTIMATED COMPLETION PROGRESS:

(7-15-08) (Rev. 6-19-18)

108-2

SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

	<u>Fiscal Year</u>	<u>Progress (% of Dollar Value)</u>
2020	(7/01/19 - 6/30/20)	22% of Total Amount Bid
2021	(7/01/20 - 6/30/21)	32% of Total Amount Bid
2022	(7/01/21 - 6/30/22)	28% of Total Amount Bid
2023	(7/01/22 - 6/30/23)	18% of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the *2018 Standard Specifications*. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE:

(10-16-07)(Rev. 2-19-19)

102-15(J)

SP1 G66

Description

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

Definitions

Additional MBE/WBE Subcontractors - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE /WBE Goal. No submittal of a Letter of Intent is required.

Combined MBE/WBE Goal: A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

Committed MBE/WBE Subcontractor - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE /WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

Contract Goal Requirement - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

Goal Confirmation Letter - Written documentation from the Department to the bidder confirming the Contractor's approved, committed participation along with a listing of the committed MBE and WBE firms.

Manufacturer - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

MBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed MBE subcontractor(s).

Minority Business Enterprise (MBE) - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

Regular Dealer - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

Replacement / Substitution – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

North Carolina Unified Certification Program (NCUCP) - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

United States Department of Transportation (USDOT) - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

WBE Participation (Anticipated) - A portion of the total contract, expressed as a percentage, that is anticipated to be performed by committed WBE subcontractor(s).

Women Business Enterprise (WBE) - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.

Forms and Websites Referenced in this Provision

Payment Tracking System - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project.
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

DBE-IS Subcontractor Payment Information - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only.
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

RF-1 MBE/WBE Replacement Request Form - Form for replacing a committed MBE or WBE.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>

SAF Subcontract Approval Form - Form required for approval to sublet the contract.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>

JC-1 Joint Check Notification Form - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

Letter of Intent - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid.
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

Listing of MBE and WBE Subcontractors Form - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx)

Subcontractor Quote Comparison Sheet - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.
<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

Combined MBE/WBE Goal

The Combined MBE/WBE Goal for this project is **11.0 %**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **5.0 %**

- (1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **6.0 %**

- (1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

Directory of Transportation Firms (Directory)

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE/WBE Goal. The Directory can be found at the following link.

<https://www.ebs.nc.gov/VendorDirectory/default.html>

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

Listing of MBE/WBE Subcontractors

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE Goal will be considered committed, even though the listing shall include both committed MBE/WBE subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE

subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

- (1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.
- (2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.
- (3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

- (1) *If the Combined MBE/WBE Goal is more than zero,*
 - (a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.
 - (b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.
 - (c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the

firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE Goal.

- (2) *If the Combined MBE/WBE Goal is zero*, entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

MBE or WBE Prime Contractor

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE Goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goal.

MBE/WBE prime contractors shall also follow Sections A and B listed under *Listing of MBE/WBE Subcontractor* just as a non-MBE/WBE bidder would.

Written Documentation – Letter of Intent

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE Goal of the contract, indicating the bidder's commitment to use the MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. of the sixth calendar day following opening of bids, unless the sixth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE Goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE Goal. If the lack of this participation drops the commitment below the Combined MBE/WBE Goal, the Contractor shall submit evidence of good faith efforts for the goal, completed in its entirety, to the State Contractor Utilization Engineer or DBE@ncdot.gov no later than 10:00 a.m. on the eighth calendar day following opening of bids, unless the eighth day falls on an official state holiday. In that situation, it is due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day.

Banking MBE/WBE Credit

If the bid of the lowest responsive bidder exceeds \$500,000 and if the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE /WBE Goal by \$1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE Goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

Submission of Good Faith Effort

If the bidder fails to meet or exceed the Combined MBE/WBE Goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal.

A hard copy and an electronic copy of this information shall be received in the office of the State Contractor Utilization Engineer or at DBE@ncdot.gov no later than 10:00 a.m. on the sixth calendar day following opening of bids unless the sixth day falls on an official state holiday. In that situation, it would be due in the office of the State Contractor Utilization Engineer no later than 10:00 a.m. on the next official state business day. If the contractor cannot send the information electronically, then one complete set and 5 copies of this information shall be received under the same time constraints above.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the

NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

- (B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE Goal will be achieved.
 - (1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
 - (2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2nd and 3rd tier subcontractors).
- (C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
 - (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.
 - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the contract goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associates and political or social

affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

- (F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at BOWD@ncdot.gov to give notification of the bidder's inability to get MBE or WBE quotes.
- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE Goal.
- (2) The bidders' past performance in meeting the contract goal.
- (3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE Goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

Non-Good Faith Appeal

The State Contractual Services Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the State Contractual Services Engineer or at

DBE@ncdot.gov. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds true for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does not count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.

(E) Suppliers

A contractor may count toward its MBE/ WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or

WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its MBE/ WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers or regular dealers:

- (1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.
- (2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

Commercially Useful Function

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

- (1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE Goal.
- (2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.
- (5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.
- (6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for

use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

MBE/WBE Replacement

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

- (a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
- (b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- (f) The listed MBE/WBE subcontractor is not a responsible contractor;
- (g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;

- (i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
- (j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:
 - (a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
 - (b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why MBE/WBE quotes were not accepted.
- (4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

(B) Decertification Replacement

- (1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.

- (2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 (*DBE Replacement Request*). If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

Changes in the Work

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

Reports and Documentation

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

Reporting Minority and Women Business Enterprise Participation

The Contractor shall provide the Engineer with an accounting of payments made to all MBE/WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for work on future DOT projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's Payment Tracking System.

Failure to Meet Contract Requirements

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

CONTRACTOR'S LICENSE REQUIREMENTS:

(7-1-95)

102-14

SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87 of the General Statutes* (licensing of electrical contractors).

USE OF UNMANNED AIRCRAFT SYSTEM (UAS):

(8-20-19)

SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system*, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

SUBSURFACE INFORMATION:

(7-1-95)

450

SP1 G112 D

Subsurface information is available on the roadway and structure portions of this project.

PORTABLE CONCRETE BARRIER - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11)

1170-4

SP1 G121

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of portable concrete barrier, provided that these materials have been delivered on the project and stored in an acceptable manner, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The provisions of Subarticle 109-5(B) of the *2018 Standard Specifications* will apply to the portable concrete barrier.

REMOVABLE PAVEMENT MARKINGS - (Partial Payments for Materials):

(7-1-95) (Rev. 8-16-11)

1205-10

SP1 G124

When so authorized by the Engineer, partial materials payments will be made up to 95 percent of the delivered cost of pavement marking tape, provided that these materials have been delivered on or in the vicinity of the project, stored in an acceptable manner, not to exceed the shelf life recommended by the manufacturer, and further provided the documents listed in Subarticle 109-5(C) of the *2018 Standard Specifications* have been furnished to the Engineer.

The Contractor shall be responsible for the material and the satisfactory performance of the material when used in the work.

The provisions of Article 109-6 of the *2018 Standard Specifications* will not apply to removable pavement marking materials.

MAINTENANCE OF THE PROJECT:

(11-20-07) (Rev. 1-17-12)

104-10

SP1 G125

Revise the *2018 Standard Specifications* as follows:

Page 1-39, Article 104-10 Maintenance of the Project, line 25, add the following after the first sentence of the first paragraph:

All guardrail/guiderail within the project limits shall be included in this maintenance.

Page 1-39, Article 104-10 Maintenance of the Project, line 30, add the following as the last sentence of the first paragraph:

The Contractor shall perform weekly inspections of guardrail and guiderail and shall report damages to the Engineer on the same day of the weekly inspection. *Where damaged guardrail or guiderail is repaired or replaced as a result of maintaining the project in accordance with this article, such repair or replacement shall be performed within 7 consecutive calendar days of such inspection report.*

Page 1-39, Article 104-10 Maintenance of the Project, lines 42-44, replace the last sentence of the last paragraph with the following:

The Contractor will not be directly compensated for any maintenance operations necessary, except for maintenance of guardrail/guiderail, as this work will be considered incidental to the work covered by the various contract items. The provisions of Article 104-7, Extra Work, and Article 104-8, Compensation and Record Keeping will apply to authorized maintenance of guardrail/guiderail. Performance of weekly inspections of guardrail/guiderail, and the damage reports required as described above, will be considered to be an incidental part of the work being paid for by the various contract items.

COOPERATION BETWEEN CONTRACTORS:

(7-1-95)

105-7

SP1 G133

The Contractor's attention is directed to Article 105-7 of the *2018 Standard Specifications*.

B-4974 & 15BPR.43 (C204259 - Stanly County) is currently under construction and located within the project limits. B-4974 & 15BPR.43 is not anticipated to be complete prior to the letting of this project.

R-2527 (Montgomery County) is located adjacent to this project and is anticipated to be let prior to the completion of this project.

The Contractor on this project shall cooperate with the Contractor working within or adjacent to the limits of this project to the extent that the work can be carried out to the best advantage of all concerned.

ELECTRONIC BIDDING:

(2-19-19)

101, 102, 103

SP1 G140

Revise the *2018 Standard Specifications* as follows:

Page 1-4, Article 101-3, DEFINITIONS, BID (OR PROPOSAL) *Electronic Bid*, line 1, replace “Bid Express®” with “the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B), Electronic Bids, lines 39-40, replace “to Bid Express®” with “via the approved electronic bidding provider”.

Page 1-15, Subarticle 102-8(B)(1), Electronic Bids, line 41, delete “from Bid Express®”

Page 1-17, Subarticle 102-9(C)(2), Electronic Bids, line 21, replace “Bid Express® miscellaneous folder within the .ebs” with “electronic submittal”.

Page 1-29, Subarticle 103-4(C)(2), Electronic Bids, line 32, replace “.ebs miscellaneous data file of Expedite” with “electronic submittal file”

BID DOCUMENTATION:

(1-1-02) (Rev.8-18-15)

103

SP1 G142

General

The successful Bidder (Contractor) shall submit the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation used to prepare the bid for this contract to the Department within 10 days after receipt of notice of award of contract. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.

The Department will not execute the contract until the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation has been received by the Department.

Terms

Bid Documentation - Bid Documentation shall mean all written information, working papers, computer printouts, electronic media, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Bidder in the preparation of the bid. The term *bid documentation* includes, but is not limited to, contractor equipment rates, contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Bidder in formulating and determining the bid. The term *bid documentation* also includes any manuals, which are standard to the industry used by the Bidder in determining the bid. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the publication and the publisher. *Bid Documentation* does not include bid documents provided by the Department for use by the Bidder in bidding on this project. The Bid Documentation can be in the form of electronic submittal (i.e. thumb drive) or paper. If the Bidder elects to submit the Bid Documentation in electronic format, the Department requires a backup submittal (i.e. a second thumb drive) in case one is corrupted.

Contractor's Representative - Officer of the Contractor's company; if not an officer, the Contractor shall supply a letter signed and notarized by an officer of the Contractor's company, granting permission for the representative to sign the escrow agreement on behalf of the Contractor.

Escrow Agent - Officer of the select banking institution or other bonded document storage facility authorized to receive and release bid documentation.

Escrow Agreement Information

A draft copy of the Escrow Agreement will be mailed to the Bidder after the notice of award for informational purposes. The Bidder and Department will sign the actual Escrow Agreement at the time the bid documentation is delivered to the Escrow Agent.

Failure to Provide Bid Documentation

The Bidder's failure to provide the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation within 10 days after the notice of award is received may be just cause for rescinding the award of the contract and may result in the removal of the Bidder from the Department's list of qualified bidders for a period of up to 180 days. Award may then be made to the next lowest responsible bidder or the work may be readvertised and constructed under the contract or otherwise, as the Department may decide.

Submittal of Bid Documentation

- (A) Appointment – Email specs@ncdot.gov or call 919.707.6900 to schedule an appointment.
- (B) Delivery - A representative of the Bidder shall deliver the original, unaltered bid documentation or a certified copy of the original, unaltered bid documentation to the Department, in a container suitable for sealing, within 10 days after the notice of award is received.

- (C) Packaging – The container shall be no larger than 15.5 inches in length by 12 inches wide by 11 inches high and shall be water resistant. The container shall be clearly marked on the face and the back of the container with the following information: Bid Documentation, Bidder's Name, Bidder's Address, Date of Escrow Submittal, Contract Number, TIP Number if applicable, and County.

Affidavit

Bid documentation will be considered a certified copy if the Bidder includes an affidavit stating that the enclosed documentation is an EXACT copy of the original documentation used by the Bidder to determine the bid for this project. The affidavit shall also list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed for escrow. The affidavit shall attest that the affiant has personally examined the bid documentation, that the affidavit lists all of the documents used by the Bidder to determine the bid for this project, and that all bid documentation has been included. The affidavit shall be signed by a chief officer of the company, have the person's name and title typed below the signature, and the signature shall be notarized at the bottom of the affidavit.

Verification

Upon delivery of the bid documentation, the Department's Contract Officer and the Bidder's representative will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist, the Bidder's representative shall immediately furnish the Department's Contract Officer with any other needed bid documentation. The Department's Contract Officer upon determining that the bid documentation is complete will, in the presence of the Bidder's representative, immediately place the complete bid documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to the Escrow Agent for placement in a safety deposit box, vault, or other secure accommodation.

Confidentiality of Bid Documentation

The bid documentation and affidavit in escrow are, and will remain, the property of the Bidder. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless the Contractor gives written notice of intent to file a claim, files a written claim, files a written and verified claim, or initiates litigation against the Department. In the event of such written notice of intent to file a claim, filing of a written claim, filing a written and verified claim, or initiation of litigation against the Department, or receipt of a letter from the Contractor authorizing release, the bid documentation and affidavit may become the property of the Department for use in considering any claim or in litigation as the Department may deem appropriate.

Any portion or portions of the bid documentation designated by the Bidder as a *trade secret* at the time the bid documentation is delivered to the Department's Contract Officer shall be protected from disclosure as provided by *G.S. 132-1.2*.

Duration and Use

The bid documentation and affidavit shall remain in escrow until 60 calendar days from the time the Contractor receives the final estimate; or until such time as the Contractor:

- (A) Gives written notice of intent to file a claim,
- (B) Files a written claim,
- (C) Files a written and verified claim,
- (D) Initiates litigation against the Department related to the contract; or
- (E) Authorizes in writing its release.

Upon the giving of written notice of intent to file a claim, filing a written claim, filing a written and verified claim, or the initiation of litigation by the Contractor against the Department, or receipt of a letter from the Contractor authorizing release, the Department may obtain the release and custody of the bid documentation.

The Bidder certifies and agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid and that no other bid documentation shall be relevant or material in litigation over claims brought by the Contractor arising out of this contract.

Release of Bid Documentation to the Contractor

If the bid documentation remains in escrow 60 calendar days after the time the Contractor receives the final estimate and the Contractor has not filed a written claim, filed a written and verified claim, or has not initiated litigation against the Department related to the contract, the Department will instruct the Escrow Agent to release the sealed container to the Contractor.

The Contractor will be notified by certified letter from the Escrow Agent that the bid documentation will be released to the Contractor. The Contractor or his representative shall retrieve the bid documentation from the Escrow Agent within 30 days of the receipt of the certified letter. If the Contractor does not receive the documents within 30 days of the receipt of the certified letter, the Department will contact the Contractor to determine final disposition of the bid documentation.

Payment

The cost of the escrow will be borne by the Department. There will be no separate payment for all costs of compilation of the data, container, or verification of the bid documentation. Payment at the various contract unit or lump sum prices in the contract will be full compensation for all such costs.

TWELVE MONTH GUARANTEE:

(7-15-03)

108

SP1 G145

- (A) The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following the date of final acceptance of the work for maintenance and shall replace such defective materials and workmanship without cost to the Department. The Contractor will not be responsible for damage due to faulty design, normal wear and tear, for negligence on the part of the Department, and/or for use in excess of the design.
- (B) Where items of equipment or material carry a manufacturer's guarantee for any period in excess of twelve months, then the manufacturer's guarantee shall apply for that particular piece of equipment or material. The Department's first remedy shall be through the manufacturer although the Contractor is responsible for invoking the warranted repair work with the manufacturer. The Contractor's responsibility shall be limited to the term of the manufacturer's guarantee. NCDOT would be afforded the same warranty as provided by the Manufacturer.

This guarantee provision shall be invoked only for major components of work in which the Contractor would be wholly responsible for under the terms of the contract. Examples would include pavement structures, bridge components, and sign structures. This provision will not be used as a mechanism to force the Contractor to return to the project to make repairs or perform additional work that the Department would normally compensate the Contractor for. In addition, routine maintenance activities (i.e. mowing grass, debris removal, ruts in earth shoulders,) are not parts of this guarantee.

Appropriate provisions of the payment and/or performance bonds shall cover this guarantee for the project.

To ensure uniform application statewide the Division Engineer will forward details regarding the circumstances surrounding any proposed guarantee repairs to the Chief Engineer for review and approval prior to the work being performed.

OUTSOURCING OUTSIDE THE USA:

(9-21-04) (Rev. 5-16-06)

SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

Outsourcing for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.

EROSION AND SEDIMENT CONTROL/STORMWATER CERTIFICATION:

(1-16-07) (Rev 04-01-19)

105-16, 225-2, 16

SP1 G180

General

Schedule and conduct construction activities in a manner that will minimize soil erosion and the resulting sedimentation and turbidity of surface waters. Comply with the requirements herein regardless of whether or not a National Pollution discharge Elimination System (NPDES) permit for the work is required.

Establish a chain of responsibility for operations and subcontractors' operations to ensure that the *Erosion and Sediment Control/Stormwater Pollution Prevention Plan* is implemented and maintained over the life of the contract.

- (A) *Certified Supervisor* - Provide a certified Erosion and Sediment Control/Stormwater Supervisor to manage the Contractor and subcontractor operations, insure compliance with Federal, State and Local ordinances and regulations, and manage the Quality Control Program.
- (B) *Certified Foreman* - Provide a certified, trained foreman for each construction operation that increases the potential for soil erosion or the possible sedimentation and turbidity of surface waters.
- (C) *Certified Installer* - Provide a certified installer to install or direct the installation for erosion or sediment/stormwater control practices.
- (D) *Certified Designer* - Provide a certified designer for the design of the erosion and sediment control/stormwater component of reclamation plans and, if applicable, for the design of the project erosion and sediment control/stormwater plan.

Roles and Responsibilities

- (A) *Certified Erosion and Sediment Control/Stormwater Supervisor* - The Certified Supervisor shall be Level II and responsible for ensuring the erosion and sediment control/stormwater plan is adequately implemented and maintained on the project and for conducting the quality control program. The Certified Supervisor shall be on the project within 24 hours notice from initial exposure of an erodible surface to the project's final acceptance. Perform the following duties:
 - (1) *Manage Operations* - Coordinate and schedule the work of subcontractors so that erosion and sediment control/stormwater measures are fully executed for each operation and in a timely manner over the duration of the contract.
 - (a) Oversee the work of subcontractors so that appropriate erosion and sediment control/stormwater preventive measures are conformed to at each stage of the work.
 - (b) Prepare the required National Pollutant Discharge Elimination System (NPDES) Inspection Record and submit to the Engineer.

- (c) Attend all weekly or monthly construction meetings to discuss the findings of the NPDES inspection and other related issues.
 - (d) Implement the erosion and sediment control/stormwater site plans requested.
 - (e) Provide any needed erosion and sediment control/stormwater practices for the Contractor's temporary work not shown on the plans, such as, but not limited to work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
 - (f) Acquire applicable permits and comply with requirements for borrow pits, dewatering, and any temporary work conducted by the Contractor in jurisdictional areas.
 - (g) Conduct all erosion and sediment control/stormwater work in a timely and workmanlike manner.
 - (h) Fully perform and install erosion and sediment control/stormwater work prior to any suspension of the work.
 - (i) Coordinate with Department, Federal, State and Local Regulatory agencies on resolution of erosion and sediment control/stormwater issues due to the Contractor's operations.
 - (j) Ensure that proper cleanup occurs from vehicle tracking on paved surfaces or any location where sediment leaves the Right-of-Way.
 - (k) Have available a set of erosion and sediment control/stormwater plans that are initialed and include the installation date of Best Management Practices. These practices shall include temporary and permanent groundcover and be properly updated to reflect necessary plan and field changes for use and review by Department personnel as well as regulatory agencies.
- (2) Requirements set forth under the NPDES Permit - The Department's NPDES Stormwater permit (NCS000250) outlines certain objectives and management measures pertaining to construction activities. The permit references *NCG010000, General Permit to Discharge Stormwater* under the NPDES, and states that the Department shall incorporate the applicable requirements into its delegated Erosion and Sediment Control Program for construction activities disturbing one or more acres of land. The Department further incorporates these requirements on all contracted bridge and culvert work at jurisdictional waters, regardless of size. Some of the requirements are, but are not limited to:
- (a) Control project site waste to prevent contamination of surface or ground waters of the state, i.e. from equipment operation/maintenance, construction materials, concrete washout, chemicals, litter, fuels, lubricants, coolants, hydraulic fluids, any other petroleum products, and sanitary waste.
 - (b) Inspect erosion and sediment control/stormwater devices and stormwater discharge outfalls at least once every 7 calendar days and within 24 hours after a rainfall event of ~~0.5~~greater than 1.0 inch that occurs within a 24 hour period. Additional monitoring may be required at the discretion of Division of Water Resources personnel if the receiving stream is 303(d) listed for turbidity and the project has had documented problems managing turbidity.

- (c) Maintain an onsite rain gauge or use the Department's Multi-Sensor Precipitation Estimate website to maintain a daily record of rainfall amounts and dates.
 - (d) Maintain erosion and sediment control/stormwater inspection records for review by Department and Regulatory personnel upon request.
 - (e) Implement approved reclamation plans on all borrow pits, waste sites and staging areas.
 - (f) Maintain a log of turbidity test results as outlined in the Department's Procedure for Monitoring Borrow Pit Discharge.
 - (g) Provide secondary containment for bulk storage of liquid materials.
 - (h) Provide training for employees concerning general erosion and sediment control/stormwater awareness, the Department's NPDES Stormwater Permit NCS000250 requirements, and the applicable requirements of the *General Permit, NCG010000*.
 - (i) Report violations of the NPDES permit to the Engineer immediately who will notify the Division of Water Quality Regional Office within 24 hours of becoming aware of the violation.
- (3) Quality Control Program - Maintain a quality control program to control erosion, prevent sedimentation and follow provisions/conditions of permits. The quality control program shall:
- (a) Follow permit requirements related to the Contractor and subcontractors' construction activities.
 - (b) Ensure that all operators and subcontractors on site have the proper erosion and sediment control/stormwater certification.
 - (c) Notify the Engineer when the required certified erosion and sediment control/stormwater personnel are not available on the job site when needed.
 - (d) Conduct the inspections required by the NPDES permit.
 - (e) Take corrective actions in the proper timeframe as required by the NPDES permit for problem areas identified during the NPDES inspections.
 - (f) Incorporate erosion control into the work in a timely manner and stabilize disturbed areas with mulch/seed or vegetative cover on a section-by-section basis.
 - (g) Use flocculants approved by state regulatory authorities where appropriate and where required for turbidity and sedimentation reduction.
 - (h) Ensure proper installation and maintenance of temporary erosion and sediment control devices.
 - (i) Remove temporary erosion or sediment control devices when they are no longer necessary as agreed upon by the Engineer.
 - (j) The Contractor's quality control and inspection procedures shall be subject to review by the Engineer. Maintain NPDES inspection records and make records available at all times for verification by the Engineer.
- (B) *Certified Foreman* - At least one Certified Foreman shall be onsite for each type of work listed herein during the respective construction activities to control erosion, prevent sedimentation and follow permit provisions:

- (1) Foreman in charge of grading activities
- (2) Foreman in charge of bridge or culvert construction over jurisdictional areas
- (3) Foreman in charge of utility activities

The Contractor may request to use the same person as the Level II Supervisor and Level II Foreman. This person shall be onsite whenever construction activities as described above are taking place. This request shall be approved by the Engineer prior to work beginning.

The Contractor may request to name a single Level II Foreman to oversee multiple construction activities on small bridge or culvert replacement projects. This request shall be approved by the Engineer prior to work beginning.

- (C) *Certified Installers* - Provide at least one onsite, Level I Certified Installer for each of the following erosion and sediment control/stormwater crew:

- (1) Seeding and Mulching
- (2) Temporary Seeding
- (3) Temporary Mulching
- (4) Sodding
- (5) Silt fence or other perimeter erosion/sediment control device installations
- (6) Erosion control blanket installation
- (7) Hydraulic tackifier installation
- (8) Turbidity curtain installation
- (9) Rock ditch check/sediment dam installation
- (10) Ditch liner/matting installation
- (11) Inlet protection
- (12) Riprap placement
- (13) Stormwater BMP installations (such as but not limited to level spreaders, retention/detention devices)
- (14) Pipe installations within jurisdictional areas

If a Level I *Certified Installer* is not onsite, the Contractor may substitute a Level II Foreman for a Level I Installer, provided the Level II Foreman is not tasked to another crew requiring Level II Foreman oversight.

- (D) *Certified Designer* - Include the certification number of the Level III-B Certified Designer on the erosion and sediment control/stormwater component of all reclamation plans and if applicable, the certification number of the Level III-A Certified Designer on the design of the project erosion and sediment control/stormwater plan.

Preconstruction Meeting

Furnish the names of the *Certified Erosion and Sediment Control/Stormwater Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* and notify the Engineer of changes in certified personnel over the life of the contract within 2 days of change.

Ethical Responsibility

Any company performing work for the North Carolina Department of Transportation has the ethical responsibility to fully disclose any reprimand or dismissal of an employee resulting from improper testing or falsification of records.

Revocation or Suspension of Certification

Upon recommendation of the Chief Engineer to the certification entity, certification for *Supervisor*, *Certified Foremen*, *Certified Installers* and *Certified Designer* may be revoked or suspended with the issuance of an *Immediate Corrective Action (ICA)*, *Notice of Violation (NOV)*, or *Cease and Desist Order* for erosion and sediment control/stormwater related issues.

The Chief Engineer may recommend suspension or permanent revocation of certification due to the following:

- (A) Failure to adequately perform the duties as defined within this certification provision.
- (B) Issuance of an ICA, NOV, or Cease and Desist Order.
- (C) Failure to fully perform environmental commitments as detailed within the permit conditions and specifications.
- (D) Demonstration of erroneous documentation or reporting techniques.
- (E) Cheating or copying another candidate's work on an examination.
- (F) Intentional falsification of records.
- (G) Directing a subordinate under direct or indirect supervision to perform any of the above actions.
- (H) Dismissal from a company for any of the above reasons.
- (I) Suspension or revocation of one's certification by another entity.

Suspension or revocation of a certification will be sent by certified mail to the certificant and the Corporate Head of the company that employs the certificant.

A certificant has the right to appeal any adverse action which results in suspension or permanent revocation of certification by responding, in writing, to the Chief Engineer within 10 calendar days after receiving notice of the proposed adverse action.

Chief Engineer
1536 Mail Service Center
Raleigh, NC 27699-1536

Failure to appeal within 10 calendar days will result in the proposed adverse action becoming effective on the date specified on the certified notice. Failure to appeal within the time specified will result in a waiver of all future appeal rights regarding the adverse action taken. The certificant will not be allowed to perform duties associated with the certification during the appeal process.

The Chief Engineer will hear the appeal and make a decision within 7 days of hearing the appeal. Decision of the Chief Engineer will be final and will be made in writing to the certificant.

If a certification is temporarily suspended, the certificant shall pass any applicable written examination and any proficiency examination, at the conclusion of the specified suspension period, prior to having the certification reinstated.

Measurement and Payment

Certified Erosion and Sediment Control/Stormwater Supervisor, Certified Foremen, Certified Installers and Certified Designer will be incidental to the project for which no direct compensation will be made.

PROCEDURE FOR MONITORING BORROW PIT DISCHARGE:

(2-20-07) (Rev. 4-5-19)

105-16, 230, 801

SP1 G181

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

If during any operating day, the downstream water quality exceeds the standard, the Contractor shall do all of the following:

- (A) Either cease discharge or modify the discharge volume or turbidity levels to bring the downstream turbidity levels into compliance, or
- (B) Evaluate the upstream conditions to determine if the exceedance of the standard is due to natural background conditions. If the background turbidity measurements exceed the standard, operation of the pit and discharge can continue as long as the stream turbidity levels are not increased due to the discharge.
- (C) Measure and record the turbidity test results (time, date and sampler) at all defined sampling locations 30 minutes after startup and at a minimum, one additional sampling of all sampling locations during that 24-hour period in which the borrow pit is discharging.
- (D) Notify DWQ within 24 hours of any stream turbidity standard exceedances that are not brought into compliance.

During the Environmental Assessment required by Article 230-4 of the *2018 Standard Specifications*, the Contractor shall define the point at which the discharge enters into the State's surface waters and the appropriate sampling locations. Sampling locations shall include points upstream and downstream from the point at which the discharge enters these waters. Upstream sampling location shall be located so that it is not influenced by backwater conditions and represents natural background conditions. Downstream sampling location shall be located at the point where complete mixing of the discharge and receiving water has occurred.

The discharge shall be closely monitored when water from the dewatering activities is introduced into jurisdictional wetlands. Any time visible sedimentation (deposition of sediment) on the wetland surface is observed, the dewatering activity will be suspended until turbidity levels in the stilling basin can be reduced to a level where sediment deposition does not occur. Staining of

wetland surfaces from suspended clay particles, occurring after evaporation or infiltration, does not constitute sedimentation. No activities shall occur in wetlands that adversely affect the functioning of a wetland. Visible sedimentation will be considered an indication of possible adverse impacts on wetland use.

The Engineer will perform independent turbidity tests on a random basis. These results will be maintained in a log within the project records. Records will include, at a minimum, turbidity test results, time, date and name of sampler. Should the Department's test results exceed those of the Contractor's test results, an immediate test shall be performed jointly with the results superseding the previous test results of both the Department and the Contractor.

The Contractor shall use the *NCDOT Turbidity Reduction Options for Borrow Pits Matrix*, available at <https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/TurbidityReductionOptionSheet.pdf> to plan, design, construct, and maintain BMPs to address water quality standards. Tier I Methods include stilling basins which are standard compensatory BMPs. Other Tier I methods are noncompensatory and shall be used when needed to meet the stream turbidity standards. Tier II Methods are also noncompensatory and are options that may be needed for protection of rare or unique resources or where special environmental conditions exist at the site which have led to additional requirements being placed in the DWQ's 401 Certifications and approval letters, Isolated Wetland Permits, Riparian Buffer Authorization or a DOT Reclamation Plan's Environmental Assessment for the specific site. Should the Contractor exhaust all Tier I Methods on a site exclusive of rare or unique resources or special environmental conditions, Tier II Methods may be required by regulators on a case by case basis per supplemental agreement.

The Contractor may use cation exchange capacity (CEC) values from proposed site borings to plan and develop the bid for the project. CEC values exceeding 15 milliequivalents per 100 grams of soil may indicate a high potential for turbidity and should be avoided when dewatering into surface water is proposed.

No additional compensation for monitoring borrow pit discharge will be paid.

PROJECT SPECIAL PROVISIONS**ROADWAY****CLEARING AND GRUBBING - METHOD II AND METHOD III:**

(9-17-02) (Rev.8-18-15)

200

SP2 R02A(Rev)

Perform clearing on this project to the limits established by Method "II" shown on Standard Drawing No. 200.02 of the *2018 Roadway Standard Drawings* from 19+61 -L- to 52+00 -L- and for 9+00 -Y1- to 28+90 -Y1- and for 10+00 -Y2- to 32+89.63 -Y2-. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

Perform clearing on the rest of the project to the limits established by Method "III" shown on Standard Drawing No. 200.03 of the *2018 Roadway Standard Drawings*. Conventional clearing methods may be used except where permit drawings or conditions have been included in the proposal which require certain areas to be cleared by hand methods.

BURNING RESTRICTIONS:

(7-1-95)

200, 210, 215

SP2 R05

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

DEMOLITION OF BUILDINGS AND APPURTENANCES:

(1-1-02) (Rev. 1-17-12)

210

SP2 R10

Demolish the buildings and appurtenances listed below in accordance with Section 210 of the *2018 Standard Specifications*:

Building Removal #1
-L- Sta 108+97 (left of centerline)
Parcel #83
single family dwelling (1247 sf)

Building Removal #2
-L- Sta 246+00 (right of centerline)
Parcel #130
metal shed (18'x25')

Building Removal #3
-L- Sta 247+50 (right of centerline)
Parcel #130
single family dwelling (1524 sf)

TEMPORARY DETOURS:

(7-1-95) (Rev. 11-19-13)

1101

SP2 R30B

Construct temporary detours required on this project in accordance with the typical sections in the plans or as directed.

After the detours have served their purpose, remove the portions deemed unsuitable for use as a permanent part of the project as directed by the Engineer. Salvage and stockpile the aggregate base course removed from the detours at locations within the right of way, as directed by the Engineer, for removal by State Forces. Place pavement and earth material removed from the detour in embankments or dispose of in waste areas furnished by the Contractor.

Aggregate base course and earth material that is removed will be measured and will be paid at the contract unit price per cubic yard for *Unclassified Excavation*. Pavement that is removed will be measured and will be paid at the contract unit price per square yard for *Removal of Existing _____ Pavement*. Pipe culverts removed from the detours remain the property of the Contractor. Pipe culverts that are removed will be measured and will be paid at the contract unit price per linear foot for *Pipe Removal*. Payment for the construction of the detours will be made at the contract unit prices for the various items involved.

Such prices and payments will be full compensation for constructing the detours and for the work of removing, salvaging, and stockpiling aggregate base course; removing pipe culverts; and for placing earth material and pavement in embankments or disposing of earth material and pavement in waste areas.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02)

235, 560

SP2 R45 B

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *2018 Standard Specifications*.

Measurement and Payment

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Borrow* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for *Unclassified Excavation*. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *2018 Standard Specifications*.

MANUFACTURED QUARRY FINES IN EMBANKMENTS:

(01-17-17)

235

SP02 R72

Description

This specification addresses the use of manufactured quarry fines that are not classified as select materials. The specification allows the Contractor an option, with the approval of the Engineer, to use manufactured quarry fines (MQFs) in embankments as a substitute for conventional borrow material. Furnish and place geotextile for pavement stabilization in accordance with the Geotextile for Pavement Stabilization special provision and detail. Geotextile for pavement stabilization is required to prevent pavement cracking and provide separation between the subgrade and pavement section at embankment locations where manufactured quarry fines are utilized and as directed by the Engineer.

Materials

Manufactured Quarry Fines.

Site specific approval of MQFs material will be required prior to beginning construction as detailed in the preconstruction requirements of this provision.

The following MQFs are unacceptable:

- (A) Frozen material,
- (B) Material with a maximum dry unit weight of less than 90 pounds per cubic foot when tested in accordance with AASHTO T-99 Method A or C.
- (C) Material with greater than 80% by weight Passing the #200 sieve

Collect and transport MQFs in a manner that will prevent nuisances and hazards to public health and safety. Moisture condition the MQFs as needed and transport in covered trucks to prevent dusting. If MQFs are blended with natural earth material, follow Borrow Criteria in Section 1018 of the *Standard Specifications*.

Geotextiles

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. If the Geotextile for Pavement Stabilization special provision is not included elsewhere in this contract, then it along with a detail will be incorporated as part of the contractors request to use. Notification of subgrade elevation, sampling and waiting period as required in the Construction Methods section of the Geotextile for Pavement Stabilization special provision are not required.

Preconstruction Requirements

When MQFs are to be used as a substitute for earth borrow material, request written approval from the Engineer at least ninety (90) days in advance of the intent to use MQFs and include the following details:

- (A) Description, purpose and location of project.
- (B) Estimated start and completion dates of project.
- (C) Estimated volume of MQFs to be used on project with specific locations and construction details of the placement.
- (D) The names, address, and contact information for the generator of the MQFs.
- (E) Physical location of the site at which the MQFs were generated.

The Engineer will forward this information to the State Materials Engineer for review and material approval.

Construction Methods

Place MQFs in the core of the embankment section with at least 4 feet of earth cover to the outside limits of the embankments or subgrade.

Construct embankments by placing MQFs in level uniform lifts with no more than a lift of 10 inches and compacted to at least a density of 95 percent as determined by test methods in AASHTO T-99, Determination of Maximum Dry Density and Optimum Moisture Content, Method A or C depending upon particle size of the product. Provide a moisture content at the time of compaction of within 4 percent of optimum but not greater than one percent above optimum as determined by AASHTO T-99, Method A or C.

Areas of embankment where MQFs are incorporated, Geotextile for Pavement Stabilization shall be used. See Geotextile for Pavement Stabilization special provision for geotextile type and construction method.

Measurement and Payment

Borrow Excavation will be measured by truck volume and paid in cubic yards in accordance with Article 230-5 of the *2018 Standard Specifications*. As an alternate weigh tickets can be provided and payment made by converting weight to cubic yards based on the verifiable unit weight. Where the pay item of *Geotextile for Pavement Stabilization* is included in the original contract the material will be measured and paid in square yards (see *Geotextile for Pavement Stabilization* special provision). Where the pay item of *Geotextile for Pavement Stabilization* is not included in the original contract then no payment will be made for this item and will be considered incidental to the use of MQFs in embankment.

FLOWABLE FILL:

(9-17-02) (Rev 1-17-12)

300, 340, 1000, 1530, 1540, 1550

SP3 R30

Description

This work consists of all work necessary to place flowable fill in accordance with these provisions, the plans, and as directed.

Materials

Refer to Division 10 of the *2018 Standard Specifications*.

Item

Flowable Fill

Section

1000-6

Construction Methods

Discharge flowable fill material directly from the truck into the space to be filled, or by other approved methods. The mix may be placed full depth or in lifts as site conditions dictate. The Contractor shall provide a method to plug the ends of the existing pipe in order to contain the flowable fill.

Measurement and Payment

At locations where flowable fill is called for on the plans and a pay item for flowable fill is included in the contract, *Flowable Fill* will be measured in cubic yards and paid as the actual number of cubic yards that have been satisfactorily placed and accepted. Such price and payment will be full compensation for all work covered by this provision including, but not limited to, the mix design, furnishing, hauling, placing and containing the flowable fill.

Payment will be made under:

Pay Item

Flowable Fill

Pay Unit

Cubic Yard

POLYPROPYLENE CULVERT PIPE:

(8-20-19)

305,310

SP3 R35

Revise the *2018 Standard Specifications* as follows:

Page 3-5, Article 305-1 DESCRIPTION, lines 12-14, replace with the following:

Where shown in the plans, the Contractor may use reinforced concrete pipe, aluminum alloy pipe, aluminized corrugated steel pipe, HDPE pipe, Polypropylene Pipe, or PVC pipe in accordance with the following requirements.

Page 3-5, Article 305-2 MATERIALS, add the following after line 16:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-2 MATERIALS, add the following after line 9:

Item	Section
Polypropylene Pipe	1032-9

Page 3-6, Article 310-4 SIDE DRAIN PIPE, lines 24-25, replace the first sentence of the second paragraph with the following:

Where shown in the plans, side drain pipe may be Class II reinforced concrete pipe, aluminized corrugated steel pipe, corrugated aluminum alloy pipe, polypropylene pipe, HDPE pipe or PVC pipe.

Page 3-7, Article 310-5 PIPE END SECTIONS, lines 2-4, replace the second sentence with the following:

Both corrugated steel and concrete pipe end sections will work on concrete pipe, corrugated steel pipe, polypropylene pipe, and HDPE smooth lined corrugated plastic pipe.

Page 3-7, Article 310-6 MEASUREMENT AND PAYMENT, add the following after line 14:

Pay Item	Pay Unit
___" Polypropylene Pipe	Linear Foot

Page 10-60, add Article 1032-9:

(A) General

Use polypropylene pipe from sources participating in the Department's Polypropylene Pipe QA/QC Program. A list of participating sources is available from the Materials and Tests Unit. The Department will remove a manufacturer of polypropylene pipe from this program if the monitoring efforts indicated that non-specification material is being provided or test procedures are not being followed.

Use polypropylene culvert pipe that meets AASHTO M 330 for Type S or Type D, or ASTM F2881 or ASTM F2764 Double or Triple wall; and has been evaluated by NTPEP.

(B) End Treatments, Pipe Tees and Elbows

End treatments, pipe tees and elbows shall meet AASHTO M 330, Section 7.7, or ASTM F2764, Section 6.6.

(C) Marking

Clearly mark each section of pipe, end section, tee and elbow and other accessories according to the Department's Polypropylene Pipe QC/QA Program:

- (1) AASHTO or ASTM Designation
- (2) The date of manufacture
- (3) Name or trademark of the manufacturer

When polypropylene pipe, end sections, tees and elbows have been inspected and accepted a sticker will be applied to the inside of the pipe. Do not use pipe sections, flared end sections, tees or elbows which do not have this seal of approval.

AGGREGATE SUBGRADE:

(5-15-18)

505

SP5 R8

Revise the *2018 Standard Specifications* as follows:

Page 5-8, Article 505-1 DESCRIPTION, lines 4-6, replace the paragraph with the following:

Construct aggregate subgrades in accordance with the contract. Install geotextile for soil stabilization and place Class IV subgrade stabilization at locations shown in the plans and as directed.

Undercut natural soil materials if necessary to construct aggregate subgrades. Define "subbase" as the portion of the roadbed below the Class IV subgrade stabilization. For Type 2 aggregate subgrades, undercut subbases as needed. The types of aggregate subgrade with thickness and compaction requirements for each are as shown below.

Type 1 – A 6 to 24 inch thick aggregate subgrade with Class IV subgrade stabilization compacted to 92% of AASHTO T 180 as modified by the Department or to the highest density that can be reasonably obtained.

Type 2 – An 8 inch thick aggregate subgrade on a proof rolled subbase with Class IV subgrade stabilization compacted to 97% of AASHTO T 180 as modified by the Department.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, line 12, insert the following after the first sentence of the first paragraph:

For Type 2 aggregate subgrades, proof roll subbases in accordance with Section 260 before installing geotextile for soil stabilization.

Page 5-8, Article 505-3 CONSTRUCTION METHODS, lines 16-17, replace the last sentence of the first paragraph with the following:

Compact ABC as required for the type of aggregate subgrade constructed.

Page 5-8, Article 505-4 MEASUREMENT AND PAYMENT, line 26, insert the following after the last sentence of the first paragraph:

Undercut Excavation of natural soil materials from subbases for Type 2 aggregate subgrades will be measured and paid in accordance with Article 225-7 or 226-3. No measurement will be made for any undercut excavation of fill materials from subbases.

CLASS IV SUBGRADE STABILIZATION IN LIEU OF CHEMICAL STABILIZATION:

(6-16-15) (Rev. 5-15-18)

501, 542

SP5 R17

Description

In lieu of chemical stabilization, provide Class IV subgrade stabilization by replacing 8 inches of subgrade soils with geotextile and Class IV select material. This substitution is allowed in full typical section width and cannot result in chemically stabilized sections less than 1,000 feet in length, unless otherwise approved by the Engineer. This substitution is not allowed for chemically stabilized sections with geotextile for pavement stabilization. Notify the Engineer at least 30 days in advance of starting Class IV subgrade stabilization in lieu of chemical stabilization. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization.

Materials

Refer to the *2018 Standard Specifications*.

Item	Section
Geotextile for Soil Stabilization, Type 4	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV subgrade stabilization.

Construction Methods

Before placing geotextile for soil stabilization below Class IV subgrade stabilization, proof roll subbases in accordance with Section 260 of the Standard Specifications. Install geotextile for soil stabilization in accordance with Article 270-3 in the *2018 Standard Specifications*. Place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *2018 Standard Specifications* for a Type 2 aggregate subgrade.

Measurement and Payment

Class IV Subgrade Stabilization in Lieu of Chemical Stabilization will be paid at the prices established in the contract that relate to the chemical stabilization type that is being replaced (lime or cement). No direct payment will be made for additional excavation required to accommodate this alternate.

The total amount paid for this subgrade stabilization alternative will be limited to the contract amounts per square yard for replacement for Portland cement or lime, theoretical tons of Portland cement or lime replaced, mixing of cement or lime, and theoretical gallons of asphalt curing seal replaced at the rate of 0.15 gallons per square yard.

A supplement agreement will be executed prior to starting the work to create a square yard price for the *Class IV Subgrade Stabilization in Lieu of Chemical Stabilization* and deleting the quantities associated with the work being replaced.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00)

620

SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2018 Standard Specifications*.

The base price index for asphalt binder for plant mix is \$ **523.21** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **August 1, 2019**.

MILLING ASPHALT PAVEMENT:

(1-15-19)

607

SP6 R59

Revise the *2018 Standard Specifications* as follows:

Page 6-5, Article 607-2, EQUIPMENT, lines 14-16, delete the seventh sentence of this Article and replace with the following:

Use either a non-contacting laser or sonar type ski system with a minimum of three referencing stations mounted on the milling machine at a length of at least 24 feet.

ASPHALT CONCRETE PLANT MIX PAVEMENTS:

(2-20-18) (Rev.1-15-19)

610, 1012

SP6 R65

Revise the *2018 Standard Specifications* as follows:

Page 6-14, Table 609-3, LIMITS OF PRECISION FOR TEST RESULTS, replace with the following:

TABLE 609-3	
LIMITS OF PRECISION FOR TEST RESULTS	
Mix Property	Limits of Precision
25.0 mm sieve (Base Mix)	± 10.0%

19.0 mm sieve (Base Mix)	± 10.0%
12.5 mm sieve (Intermediate & Type P-57)	± 6.0%
9.5 mm sieve (Surface Mix)	± 5.0%
4.75 mm sieve (Surface Mix)	± 5.0%
2.36 mm sieve (All Mixes, except S4.75A)	± 5.0%
1.18 mm sieve (S4.75A)	± 5.0%
0.075 mm sieve (All Mixes)	± 2.0%
Asphalt Binder Content	± 0.5%
Maximum Specific Gravity (G_{mm})	± 0.020
Bulk Specific Gravity (G_{mb})	± 0.030
TSR	± 15.0%
QA retest of prepared QC Gyratory Compacted Volumetric Specimens	± 0.015
Retest of QC Core Sample	± 1.2% (% Compaction)
Comparison QA Core Sample	± 2.0% (% Compaction)
QA Verification Core Sample	± 2.0% (% Compaction)
Density Gauge Comparison of QC Test	± 2.0% (% Compaction)
QA Density Gauge Verification Test	± 2.0% (% Compaction)

Page 6-17, Table 610-1, MIXING TEMPERATURE AT THE ASPHALT PLANT, replace with the following:

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	JMF Temperature
PG 58-28; PG 64-22	250 - 290°F
PG 76-22	300 - 325°F

Page 6-17, Subarticle 610-3(C), Job Mix Formula (JMF), lines 38-39, delete the fourth paragraph.

Page 6-18, Subarticle 610-3(C), Job Mix Formula (JMF), line 12, replace “SF9.5A” with “S9.5B”.

Page 6-18, Table 610-3, MIX DESIGN CRITERIA, replace with the following:

TABLE 610-3 MIX DESIGN CRITERIA									
Mix Type	Design ESALs millions ^A	Binder PG Grade	Compaction Levels		Max. Rut Depth (mm)	Volumetric Properties ^B			
			G _{mm} @			VMA	VTM	VFA	%G _{mm} @ N _{ini}
			N _{ini}	N _{des}		% Min.	%	Min.-Max.	
S4.75A	< 1	64 - 22	6	50	11.5	16.0	4.0 - 6.0	65 - 80	≤ 91.5
S9.5B	0 - 3	64 - 22	6	50	9.5	16.0	3.0 - 5.0	70 - 80	≤ 91.5
S9.5C	3 - 30	64 - 22	7	65	6.5	15.5	3.0 - 5.0	65 - 78	≤ 90.5
S9.5D	> 30	76 - 22	8	100	4.5	15.5	3.0 - 5.0	65 - 78	≤ 90.0
I19.0C	ALL	64 - 22	7	65	-	13.5	3.0 - 5.0	65 - 78	≤ 90.5
B25.0C	ALL	64 - 22	7	65	-	12.5	3.0 - 5.0	65 - 78	≤ 90.5
	Design Parameter					Design Criteria			
All Mix	Dust to Binder Ratio (P _{0.075} / P _{be})					0.6 - 1.4 ^C			

Types	Tensile Strength Ratio (TSR) ^D		85% Min. ^E
<p>A. Based on 20 year design traffic.</p> <p>B. Volumetric Properties based on specimens compacted to N_{des} as modified by the Department.</p> <p>C. Dust to Binder Ratio (P_{0.075} / P_{be}) for Type S4.75A is 1.0 - 2.0.</p> <p>D. NCDOT-T-283 (No Freeze-Thaw cycle required).</p> <p>E. TSR for Type S4.75A & B25.0C mixes is 80% minimum.</p>			

Page 6-20, Table 610-5, BINDER GRADE REQUIREMENTS (BASED ON RBR%), replace with the following:

**TABLE 610-5
BINDER GRADE REQUIREMENTS (BASED ON RBR%)**

Mix Type	%RBR ≤ 20%	21% ≤ %RBR ≤ 30%	%RBR ≥ 30%
S4.75A, S9.5B, S9.5C, I19.0C, B25.0C	PG 64-22	PG 64-22 ^A	PG-58-28
S9.5D, OGFC	PG 76-22 ^B	n/a	n/a

- A.** If the mix contains any amount of RAS, the virgin binder shall be PG 58-28.
- B.** Maximum Recycled Binder Replacement (%RBR) is 18% for mixes using PG 76-22 binder.

Page 6-20, Table 610-6, PLACEMENT TEMPERATURES FOR ASPHALT, replace with the following:

TABLE 610-6 PLACEMENT TEMPERATURES FOR ASPHALT	
Asphalt Concrete Mix Type	Minimum Surface and Air Temperature
B25.0C	35°F
I19.0C	35°F
S4.75A, S9.5B, S9.5C	40°F ^A
S9.5D	50°F

- A.** For the final layer of surface mixes containing recycled asphalt shingles (RAS), the minimum surface and air temperature shall be 50°F.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 34-35, delete the second sentence and replace with the following:

Use an MTV for all surface mix regardless of binder grade on Interstate, US Routes, and NC Routes (primary routes) that have 4 or more lanes and median divided.

Page 6-21, Article 610-8, SPREADING AND FINISHING, lines 36-38, delete the fourth sentence and replace with the following:

Use MTV for all ramps, loops, Y-line that have 4 or more lanes and are median divided, full width acceleration lanes, full width deceleration lanes, and full width turn lanes that are greater than 1000 feet in length.

Page 6-23, Table 610-7, DENSITY REQUIREMENTS, replace with the following:

TABLE 610-7 DENSITY REQUIREMENTS

Mix Type	Minimum % G_{mm} (Maximum Specific Gravity)
S4.75A	85.0 ^A
S9.5B	90.0
S9.5C, S9.5D, I19.0C, B25.0C	92.0

- A. Compaction to the above specified density will be required when the S4.75A mix is applied at a rate of 100 lbs/sy or higher.

Page 6-24, Article 610-13, FINAL SURFACE TESTING, lines 35-36, delete the second sentence and replace with the following:

Final surface testing is not required on ramps, loops and turn lanes.

Page 6-26, Subarticle 610-13(A)(1), Acceptance for New Construction, lines 29-30, delete the second sentence and replace with the following:

Areas excluded from testing by the profiler may be tested using a 10-foot straightedge in accordance with Article 610-12.

Page 6-27, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 41-46, delete the eighth and ninth sentence of this paragraph and replace with the following:

Take profiles over the entire length of the final surface travel lane pavement exclusive of structures, approach slabs, paved shoulders, tapers, or other irregular shaped areas of pavement, unless otherwise approved by the Engineer. Test in accordance with this provision all mainline travel lanes, full width acceleration or deceleration lanes and collector lanes.

Page 6-28, Subarticle 610-13(B), Option 2- North Carolina Hearne Straightedge, lines 1-2, delete these two lines.

Page 6-32, Article 610-16 MEASUREMENT AND PAYMENT, replace with the following:

Pay Item	Pay Unit
Asphalt Concrete Base Course, Type B25.0C	Ton
Asphalt Concrete Intermediate Course, Type I19.0C	Ton
Asphalt Concrete Surface Course, Type S4.75A	Ton
Asphalt Concrete Surface Course, Type S9.5B	Ton
Asphalt Concrete Surface Course, Type S9.5C	Ton
Asphalt Concrete Surface Course, Type S9.5D	Ton

Page 10-30, Table 1012-1, AGGREGATE CONSENSUS PROPERTIES, replace with the following:

**TABLE 1012-1
AGGREGATE CONSENSUS PROPERTIES^A**

Mix Type	Coarse Aggregate Angularity^B	Fine Aggregate Angularity % Minimum	Sand Equivalent % Minimum	Flat and Elongated 5 : 1 Ratio % Maximum
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<i>Test Method</i>	<i>ASTM D5821</i>	<i>AASHTO T 304</i>	<i>AASHTO T 176</i>	<i>ASTM D4791</i>
S4.75A; S9.5B	75 / -	40	40	-
S9.5C; I19.0C; B25.0C	95 / 90	45	45	10
S9.5D	100 / 100	45	50	10
OGFC	100 / 100	45	45	10
UBWC	100 / 85	45	45	10

A. Requirements apply to the design aggregate blend.

B. 95 / 90 denotes that 95% of the coarse aggregate has one fractured face and 90% has 2 or more fractured faces.

AUTOMATED MACHINE GUIDANCE

(1-2-11)

801

SP8 R01

General

This Special Provision contains requirements to be followed if the Contractor elects to use Global Positioning System (GPS) machine control grading and shall be used in conjunction with Section 801 of the *Standard Specifications*. The use of this technology is referenced as Automated Machine Guidance (AMG).

All equipment using AMG shall be able to generate end results that meet the *Standard Specifications*. Perform test sections for each type of work to be completed with AMG to demonstrate that the system has the capability to achieve acceptable results. If acceptable results cannot be achieved, conform to the requirements for conventional stakeout.

The Contractor shall be responsible for all errors resulting from the use of AMG and shall correct deficiencies to the satisfaction of the Engineer at no cost to the Department.

Submittals

If the Contractor elects to use AMG, a Digital Terrain Model (DTM) of the design surface and all intermediate surfaces shall be developed and submitted to the Engineer for review.

At least 90 days prior to beginning grading operations, the Contractor shall submit to the Engineer an AMG work plan to include, but not limited to, proposed equipment, control software manufacturer and version, types of work to be completed using AMG, project site calibration report, repetitive calibration methods for construction equipment and rover units to be used for the duration of the project, and local GPS base station to be used for broadcasting differential correction data to rover units (this may include the NC Network RTK). All surveys must be tied to existing project control as established by NCDOT.

Inspection

The Engineer will perform quality assurance checks of all work associated with AMG. If it is determined that work is not being performed in a manner that will assure accurate results, the Engineer may require corrective action at no cost to the Department.

The Contractor shall provide the Engineer with one GPS rover unit for use during the duration of the contract. The rover will be loaded with the same model that is used with the AMG and have the same capability as rover units used by the Contractor. The rover will be kept in the possession of the Engineer and will be returned to the Contractor upon completion of the contract. Any maintenance or repairs required for the rover will be the responsibility of the Contractor. Formal training of at least 8 hours shall be provided to the Engineer by the Contractor on the use of the proposed AMG system.

Subgrade and Base Controls

If the Contractor elects to use AMG for fine grading and placement of base or other roadway materials, the GPS shall be supplemented with a laser or robotic total station. Include details of the proposed system in the AMG work plan. In addition, the following requirements apply for the use of AMG for subgrade and base construction.

Provide control points at intervals along the project not to exceed 1,000 feet. The horizontal position of these points shall be determined by static GPS sessions or by traverse connection from the original base line control points. The elevation of these control points shall be established using differential leveling from project benchmarks, forming closed loops where practical. A copy of all new control point information shall be provided to the Engineer prior to construction activities.

Provide control points and conventional survey grade stakes at 500 foot intervals and at critical points such as, but not limited to, PCs, PTs, superelevation transition points, and other critical points as requested by the Engineer.

Provide hubs at the top of the finished subgrade at all hinge points on the cross section at 500 foot intervals. These hubs shall be established using conventional survey methods for use by the Engineer to check the accuracy of construction.

Measurement and Payment

No direct payment will be made for work required to utilize this provision. All work will be considered incidental to various grading operations.

MODIFIED CONCRETE FLUME WITH CONCRETE OUTLET:

(3-19-96)(Rev. 6-17-08)

825

SP8 R10

At locations shown in the plans, construct concrete flumes, concrete curb, and apron in accordance with the details in the plans. Use materials meeting the requirements of Section 825 of the *2018 Standard Specifications* except that the concrete must be Class B or of higher compressive strength.

Each concrete flume, concrete curb, and apron completed and accepted will be paid at the contract unit price per each for *Modified Concrete Flume*. Such price and payment will be full compensation for all materials, labor, equipment, tools, removing and disposing of the temporary slope drains, and any other incidentals necessary to complete the work satisfactorily.

The concrete curb and ditch outside the pay limits of the apron will be measured and paid in accordance with Section 846 and 850 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item

Modified Concrete Flume

Pay Unit

Each

PRECAST CONCRETE PARKING CURBS:

In accordance with the detail and in locations shown in the plans or as directed by the Engineer, the Contractor will be required to install precast concrete parking curbs.

The quantity of precast concrete parking curbs to be paid for will be the actual number of precast concrete parking curbs installed, which have been completed and accepted.

The quantity of precast concrete parking curbs, measured as provided above, will be paid for at the contract unit price per each for "PRECAST CONCRETE PARKING CURBS". Such price and payment will be full compensation for all work covered by this provision including but not limited to labor, materials, equipment, and incidentals necessary to satisfactorily complete the work.

Payment will be made under:

Precast Concrete Parking Curbs.....Each

GUARDRAIL END UNITS, TYPE - TL-2:

(10-21-08) (Rev. 7-1-17)

862

SP8 R64

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at <https://apps.dot.state.nc.us/vendor/approvedproducts/> or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 2 in accordance with Article 106-2 of the *2018 Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item

Guardrail End Units, Type TL-2

Pay Unit

Each

GUARDRAIL END UNITS AND TEMPORARY GUARDRAIL END UNITS:

(4-20-04) (Rev. 7-1-17)

862

SP8 R65 (Rev.)

Description

Furnish and install guardrail end units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2018 Standard Specifications*, and at locations shown in the plans.

Materials

Furnish guardrail end units listed on the NCDOT Approved Products List at <https://apps.dot.state.nc.us/vendor/approvedproducts/> or approved equal.

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each guardrail end unit certifying it meets the requirements of the AASHTO Manual for Assessing Safety Hardware, Test Level 3, in accordance with Article 106-2 of the *2018 Standard Specifications*.

- (B) Certified working drawings and assembling instructions from the manufacturer for each guardrail end unit in accordance with Article 105-2 of the *2018 Standard Specifications*.

No modifications shall be made to the guardrail end unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Article 1088-3 of the *2018 Standard Specifications* and is incidental to the cost of the guardrail end unit.

Measurement and Payment

Measurement and payment will be made in accordance with Article 862-6 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail End Units, Type_____	Each
Temporary Guardrail End Units, Type_____	Each

TEMPORARY WOVEN WIRE FENCE:

(7-1-95) (Rev. 1-19-16)

866

SP8 R85

Description

Construct a temporary woven wire fence, posts, gates, and barbed wire at locations shown on the plans.

Materials

Use only fabric and posts that have been approved by the Engineer. Materials shall meet the requirements of Article 866-2 of the *2018 Standard Specifications*.

Construction Methods

Construct the fence in accordance with Subarticle 866-3(C) and the *Roadway Standard Drawing* 866.02. The fence shall be maintained with fabric taut and securely fastened to the posts at all times. Barbed wire shall be installed along the top of the posts and at any ditch locations as determined by the Engineer.

After the fence has served its purpose and is no longer needed, as determined by the Engineer, it will become the property of the Contractor and shall be removed and disposed of by him.

Measurement and Payment

Temporary ___" Woven Wire Fence, Complete with Posts will be measured and paid as the actual number of linear feet of fence constructed and accepted, measured in place from center of end post to center of end post. Such price and payment will be full compensation for all materials, labor, fence maintenance, and incidentals including fence, posts, gates, and barbed wire necessary to satisfactorily complete the work.

Payment will be made under:

Pay Item

Temporary ___" Woven Wire Fence, Complete with Posts

Pay Unit

Linear Foot

FOUNDATIONS AND ANCHOR ROD ASSEMBLIES FOR METAL POLES:

(1-17-12) (Rev. 1-16-18)

9, 14, 17

SP9 R05

Description

Foundations for metal poles include foundations for signals, cameras, overhead and dynamic message signs (DMS) and high mount and light standards supported by metal poles or upright trusses. Foundations consist of footings with pedestals and drilled piers with or without grade beams or wings. Anchor rod assemblies consist of anchor rods (also called anchor bolts) with nuts and washers on the exposed ends of rods and nuts and a plate or washers on the other ends of rods embedded in the foundation.

Construct concrete foundations with the required resistances and dimensions and install anchor rod assemblies in accordance with the contract and accepted submittals. Construct drilled piers consisting of cast-in-place reinforced concrete cylindrical sections in excavated holes. Provide temporary casings or polymer slurry as needed to stabilize drilled pier excavations. Use a prequalified Drilled Pier Contractor to construct drilled piers for metal poles. Define "excavation" and "hole" as a drilled pier excavation and "pier" as a drilled pier.

This provision does not apply to foundations for signal pedestals; see Section 1743 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1743.01.

Materials

Refer to the *2018 Standard Specifications*.

Item

Conduit

Grout, Type 2

Polymer Slurry

Portland Cement Concrete

Reinforcing Steel

Rollers and Chairs

Temporary Casings

Section

1091-3

1003

411-2(B)(2)

1000

1070

411-2(C)

411-2(A)

Provide Type 3 material certifications in accordance with Article 106-3 of the *2018 Standard Specifications* for conduit, rollers, chairs and anchor rod assemblies. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store foundation and anchor rod assembly materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

Use conduit type in accordance with the contract. Use Class A concrete for footings and pedestals, Class Drilled Pier concrete for drilled piers and Class AA concrete for grade beams and wings including portions of drilled piers above bottom of wings elevations. Corrugated temporary casings may be accepted at the discretion of the Engineer. A list of approved polymer slurry products is available from:

connect.ncdot.gov/resources/Geological/Pages/Products.aspx

Provide anchor rod assemblies in accordance with the contract consisting of the following:

- (A) Straight anchor rods,
- (B) Heavy hex top and leveling nuts and flat washers on exposed ends of rods, and
- (C) Nuts and either flat plates or washers on the other ends of anchor rods embedded in foundations.

Do not use lock washers. Use steel anchor rods, nuts and washers that meet ASTM F1554 for Grade 55 rods and Grade A nuts. Use steel plates and washers embedded in concrete with a thickness of at least 1/4". Galvanize anchor rods and exposed nuts and washers in accordance with Article 1076-4 of the *2018 Standard Specifications*. It is not necessary to galvanize nuts, plates and washers embedded in concrete.

Construction Methods

Install the required size and number of conduits in foundations in accordance with the plans and accepted submittals. Construct top of piers, footings, pedestals, grade beams and wings flat, level and within 1" of elevations shown in the plans or approved by the Engineer. Provide an Ordinary Surface finish in accordance with Subarticle 825-6(B) of the *2018 Standard Specifications* for portions of foundations exposed above finished grade. Do not remove anchor bolt templates or pedestal or grade beam forms or erect metal poles or upright trusses onto foundations until concrete attains a compressive strength of at least 3,000 psi.

(A) Drilled Piers

Before starting drilled pier construction, hold a predrill meeting to discuss the installation, monitoring and inspection of the drilled piers. Schedule this meeting after the Drilled Pier Contractor has mobilized to the site. The Resident or Division Traffic Engineer, Contractor and Drilled Pier Contractor Superintendent will attend this predrill meeting.

Do not excavate holes, install piles or allow equipment wheel loads or vibrations within 20 ft of completed piers until 16 hours after Drilled Pier concrete reaches initial set.

Check for correct drilled pier alignment and location before beginning drilling. Check plumbness of holes frequently during drilling.

Construct drilled piers with the minimum required diameters shown in the plans. Install piers with tip elevations no higher than shown in the plans or approved by the Engineer.

Excavate holes with equipment of the sizes required to construct drilled piers. Depending on the subsurface conditions encountered, drilling through rock and boulders may be required. Do not use blasting for drilled pier excavations.

Contain and dispose of drilling spoils and waste concrete as directed and in accordance with Section 802 of the *2018 Standard Specifications*. Drilling spoils consist of all materials and fluids removed from excavations.

If unstable, caving or sloughing materials are anticipated or encountered, stabilize holes with temporary casings and/or polymer slurry. Do not use telescoping temporary casings. If it becomes necessary to replace a temporary casing during drilling, backfill the excavation, insert a larger casing around the casing to be replaced or stabilize the excavation with polymer slurry before removing the temporary casing.

If temporary casings become stuck or the Contractor proposes leaving casings in place, temporary casings should be installed against undisturbed material. Unless otherwise approved, do not leave temporary casings in place for mast arm poles and cantilever signs. The Engineer will determine if casings may remain in place. If the Contractor proposes leaving temporary casings in place, do not begin drilling until a casing installation method is approved.

Use polymer slurry and additives to stabilize holes in accordance with the slurry manufacturer's recommendations. Provide mixing water and equipment suitable for polymer slurry. Maintain the required slurry properties at all times except for sand content.

Define a "sample set" as slurry samples collected from mid-height and within 2 ft of the bottom of holes. Take sample sets from excavations to test polymer slurry immediately after filling holes with slurry, at least every 4 hours thereafter and immediately before placing concrete. Do not place Drilled Pier concrete until both slurry samples from an excavation meet the required polymer slurry properties. If any slurry test results do not meet the requirements, the Engineer may suspend drilling until both samples from a sample set meet the required polymer slurry properties.

Remove soft and loose material from bottom of holes using augers to the satisfaction of the Engineer. Assemble rebar cages and place cages and Drilled Pier concrete in accordance with Subarticle 411-4(E) of the *2018 Standard Specifications* except for the following:

- (1) Inspections for tip resistance and bottom cleanliness are not required,
- (2) Temporary casings may remain in place if approved, and

- (3) Concrete placement may be paused near the top of pier elevations for anchor rod assembly installation and conduit placement or
- (4) If applicable, concrete placement may be stopped at bottom of grade beam or wings elevations for grade beam or wing construction.

If wet placement of concrete is anticipated or encountered, do not place Drilled Pier concrete until a concrete placement procedure is approved. If applicable, temporary casings and fluids may be removed when concrete placement is paused or stopped in accordance with the exceptions above provided holes are stable. Remove contaminated concrete from exposed Drilled Pier concrete after removing casings and fluids. If holes are unstable, do not remove temporary casings until a procedure for placing anchor rod assemblies and conduit or constructing grade beams or wings is approved.

Use collars to extend drilled piers above finished grade. Remove collars after Drilled Pier concrete sets and round top edges of piers.

If drilled piers are questionable, pile integrity testing (PIT) and further investigation may be required in accordance with Article 411-5 of the *2018 Standard Specifications*. A drilled pier will be considered defective in accordance with Subarticle 411-5(D) of the *2018 Standard Specifications* and drilled pier acceptance is based in part on the criteria in Article 411-6 of the *2018 Standard Specifications* except for the top of pier tolerances in Subarticle 411-6(C) of the *2018 Standard Specifications*.

If a drilled pier is under further investigation, do not grout core holes, backfill around the pier or perform any work on the drilled pier until the Engineer accepts the pier. If the drilled pier is accepted, dewater and grout core holes and backfill around the pier with approved material to finished grade. If the Engineer determines a pier is unacceptable, remediation is required in accordance with Article 411-6 of the *2018 Standard Specifications*. No extension of completion date or time will be allowed for remediation of unacceptable drilled piers or post repair testing.

Permanently embed a plate in or mark top of piers with the pier diameter and depth, size and number of vertical reinforcing bars and the minimum compressive strength of the concrete mix at 28 days.

(B) Footings, Pedestals, Grade Beams and Wings

Excavate as necessary for footings, grade beams and wings in accordance with the plans, accepted submittals and Section 410 of the *2018 Standard Specifications*. If unstable, caving or sloughing materials are anticipated or encountered, shore foundation excavations as needed with an approved method. Notify the Engineer when foundation excavation is complete. Do not place concrete or reinforcing steel until excavation dimensions and foundation material are approved.

Construct cast-in-place reinforced concrete footings, pedestals, grade beams and wings with the dimensions shown in the plans and in accordance with Section 825 of the *2018 Standard Specifications*. Use forms to construct portions of pedestals and grade beams protruding above finished grade. Provide a chamfer with a 3/4" horizontal width

for pedestal and grade beam edges exposed above finished grade. Place concrete against undisturbed soil or backfill and fill in accordance with Article 410-8 of the *2018 Standard Specifications*. Proper compaction around footings and wings is critical for foundations to resist uplift and torsion forces.

(C) Anchor Rod Assemblies

Size anchor rods for design and the required projection above top of foundations. Determine required anchor rod projections from nut, washer and base plate thicknesses, the protrusion of 3 to 5 anchor rod threads above top nuts after tightening and the distance of one nut thickness between top of foundations and bottom of leveling nuts.

Protect anchor rod threads from damage during storage and installation of anchor rod assemblies. Before placing anchor rods in foundations, turn nuts onto and off rods past leveling nut locations. Turn nuts with the effort of one workman using an ordinary wrench without a cheater bar. Report any thread damage to the Engineer that requires extra effort to turn nuts.

Arrange anchor rods symmetrically about center of base plate locations as shown in the plans. Set anchor rod elevations based on required projections above top of foundations. Securely brace and hold rods in the correct position, orientation and alignment with a steel template. Do not weld to reinforcing steel, temporary casings or anchor rods.

Install top and leveling (bottom) nuts, washers and the base plate for each anchor rod assembly in accordance with the following procedure:

- (1) Turn leveling nuts onto anchor rods to a distance of one nut thickness between the top of foundation and bottom of leveling nuts. Place washers over anchor rods on top of leveling nuts.
- (2) Determine if nuts are level using a flat rigid template on top of washers. If necessary, lower leveling nuts to level the template in all directions or if applicable, lower nuts to tilt the template so the metal pole or upright truss will lean as shown in the plans. If leveling nuts and washers are not in full contact with the template, replace washers with galvanized beveled washers.
- (3) Verify the distance between the foundation and leveling nuts is no more than one nut thickness.
- (4) Place base plate with metal pole or upright truss over anchor rods on top of washers. High mount luminaires may be attached before erecting metal poles but do not attach cables, mast arms or trusses to metal poles or upright trusses at this time.
- (5) Place washers over anchor rods on top of base plate. Lubricate top nut bearing surfaces and exposed anchor rod threads above washers with beeswax, paraffin or other approved lubricant.
- (6) Turn top nuts onto anchor rods. If nuts are not in full contact with washers or washers are not in full contact with the base plate, replace washers with galvanized beveled washers.
- (7) Tighten top nuts to snug-tight with the full effort of one workman using a 12" wrench. Do not tighten any nut all at once. Turn top nuts in increments. Follow a star pattern cycling through each nut at least twice.

- (8) Repeat (7) for leveling nuts.
- (9) Replace washers above and below the base plate with galvanized beveled washers if the slope of any base plate face exceeds 1:20 (5%), any washer is not in firm contact with the base plate or any nut is not in firm contact with a washer. If any washers are replaced, repeat (7) and (8).
- (10) With top and leveling nuts snug-tight, mark each top nut on a corner at the intersection of 2 flats and a corresponding reference mark on the base plate. Mark top nuts and base plate with ink or paint that is not water-soluble. Use the turn-of-nut method for pretensioning. Do not pretension any nut all at once. Turn top nuts in increments for a total turn that meets the following nut rotation requirements:

NUT ROTATION REQUIREMENTS (Turn-of-Nut Pretensioning Method)	
Anchor Rod Diameter, inch	Requirement
$\leq 1 \frac{1}{2}$	1/3 turn (2 flats)
$> 1 \frac{1}{2}$	1/6 turn (1 flat)

Follow a star pattern cycling through each top nut at least twice.

- (11) Ensure nuts, washers and base plate are in firm contact with each other for each anchor rod. Cables, mast arms and trusses may now be attached to metal poles and upright trusses.
- (12) Between 4 and 14 days after pretensioning top nuts, use a torque wrench calibrated within the last 12 months to check nuts in the presence of the Engineer. Completely erect mast arm poles and cantilever signs and attach any hardware before checking top nuts for these structures. Check that top nuts meet the following torque requirements:

TORQUE REQUIREMENTS	
Anchor Rod Diameter, inch	Requirement, ft-lb
7/8	180
1	270
1 1/8	380
1 1/4	420
$\geq 1 \frac{1}{2}$	600

If necessary, retighten top nuts in the presence of the Engineer with a calibrated torque wrench to within ± 10 ft-lb of the required torque. Do not overtighten top nuts.

- (13) Do not grout under base plate.

Measurement and Payment

Foundations and anchor rod assemblies for metal poles and upright trusses will be measured and paid for elsewhere in the contract.

No payment will be made for temporary casings that remain in drilled pier excavations. No payment will be made for PIT. No payment will be made for further investigation of defective piers. Further investigation of piers that are not defective will be paid as extra work in accordance with Article 104-7 of the *2018 Standard Specifications*. No payment will be made for remediation of unacceptable drilled piers or post repair testing.

HIGH STRENGTH CONCRETE FOR DRIVEWAYS:

(11-21-00) (Rev. 1-17-12)

848

SP10 R02

Use high early strength concrete for all driveways shown in the plans and as directed by the Engineer. Provide high early strength concrete that meets the requirements of Article 1000-5 of the *2018 Standard Specifications*.

Measurement and payment will be in accordance with Section 848 of the *2018 Standard Specifications*.

THERMOPLASTIC PAVEMENT MARKING MATERIAL – COLOR TESTING:

3-19-19

1087

SP10 R05

Revise the *2018 Standard Specifications* as follows:

Pages 10-183 and 10-184, Subarticle 1087-7(D)(1)(b) Yellow, lines 9-11, delete and replace with the following:

Obtain Color Values Y,x,y per ASTM E1349 using C/2° illuminant/observer.
Results shall be $Y \geq 45\%$, and x,y shall fall within PR#1 chart chromaticity limits.

SNOWPLOWABLE PAVEMENT MARKERS:

3-19-19

1086, 1250, 1253

SP10 R07

Revise the *2018 Standard Specifications* as follows:

Pages 10-177 and 10-178, Subarticle 1086-3 SNOWPLOWABLE PAVEMENT MARKERS, delete items (A), (B) and (C)(1) and replace with the following:

(A) General

Use snowplowable pavement markers evaluated by NTPEP. The snowplowable pavement marker shall consist of a housing with one or more glass or plastic face lens type reflective lenses to provide the required color designation. Shape the housing to deflect a snowplow blade upward in both directions without being damaged. Plastic lens faces shall use an abrasion resistant coating.

Use recycled snowplowable pavement markers that meet all the requirements of new snowplowable pavement markers except Subarticle 1086-3(B)(1). Recycled snowplowable pavement markers with minimal variation in dimensions are acceptable only when the reflector fits in the housing of the recycled snowplowable pavement marker as originally designed.

(B) Housings**(1) Dimensions**

The dimension, slope and minimum area of reflecting surface shall conform to dimensions as shown in the plans. The minimum area of each reflecting surface shall be 1.44 sq.in.

(2) Materials

Use snowplowable pavement markers that are on the NCDOT Approved Products List.

(3) Surface

The surface of the housing shall be free of scale, dirt, rust, oil, grease or any other contaminant which might reduce its bond to the epoxy adhesive.

(4) Identification

Mark the housing with the manufacturer's name and model number of marker.

(C) Reflectors

(1) General

Laminate the reflector to an elastomeric pad and attach with adhesive to the housing. The thickness of the elastomeric pad shall be 0.04".

Pages 12-14, Subarticle 1250-3(C) Removal of Existing Pavement Markers, lines 19-29, delete and replace with the following:

Remove the existing raised pavement markers or the snowplowable pavement markers including the housings, before overlaying an existing roadway with pavement. Repair the pavement by filling holes as directed by the Engineer.

When traffic patterns are changed in work zones due to construction or reconstruction, remove all raised pavement markers or snowplowable markers including housings that conflict with the new traffic pattern before switching traffic to the new traffic pattern. Lens removal in lieu of total housing removal is not an acceptable practice for snowplowable markers.

Properly dispose of the removed pavement markers. No direct payment will be made for removal or disposal of existing pavement markers or repair of pavement, as such work will be incidental to other items in the contract.

Pages 12-16 and 12-17, Subarticle 1253-3 CONSTRUCTION METHODS, delete items (A), (B) and (C) and replace with the following:

(A) General

Bond marker housings to the pavement with epoxy adhesive. Mechanically mix and dispense epoxy adhesives as required by the manufacturer's specifications. Place the markers immediately after the adhesive has been mixed and dispensed.

Install snowplowable pavement marker housings into slots sawcut into the pavement. Make slots in the pavement to exactly duplicate the shape of the housing of the snowplowable pavement markers.

Promptly remove all debris resulting from the saw cutting operation from the pavement surface. Install the marker housings within 7 calendar days after saw cutting slots in the pavement. Remove and dispose of loose material from the slots by brushing, blow cleaning or vacuuming. Dry the slots before applying the epoxy adhesive. Fill the cleaned slots totally with epoxy adhesive flush with the surface of the existing pavement. Install snowplowable pavement markers according to the manufacturer's recommendations.

Protect the snowplowable pavement markers until the epoxy has initially cured and is track free.

(B) Reflector Replacement

In the event that a reflector is damaged, replace the damaged reflector by using adhesives and methods recommended by the manufacturer of the markers and approved by the Engineer. This work is considered incidental if damage occurs during the initial installation of the marker housings and maintenance of initial snowplowable markers specified in this section. This work will be paid for under the pay item for the type of reflector replacement if the damage occurred after the initial installation of the snowplowable pavement marker.

Missing housings shall be replaced. Broken housings shall be removed and replaced. In both cases the slot for the housings shall be properly prepared prior to installing the new housing. Removal of broken housings and preparation of slots will be considered incidental to the work of replacing housings.

(C) Recycled Snowplowable Pavement Marker Housings

Use properly refurbished snowplowable pavement marker housings as approved by the Engineer such that approved new reflectors can be installed inside the housings.

TEMPORARY SHORING:

(2-20-07) (Rev. 1-16-18)

SP11 R02

Description

Temporary shoring includes cantilever, braced and anchored shoring and temporary mechanically stabilized earth (MSE) walls. Temporary shoring does not include trench boxes. At the Contractor's option, use any type of temporary shoring unless noted otherwise in the plans or as directed. Design and construct temporary shoring based on actual elevations and shoring dimensions in accordance with the contract and accepted submittals. Construct temporary shoring at locations shown in the plans and as directed. Temporary shoring is required to maintain traffic when a 2:1 (H:V) slope from the top of an embankment or bottom of an excavation will intersect the existing ground line less than 5 feet from the edge of pavement of an open travelway. This provision does not apply to pipe, inlet or utility installation unless noted otherwise in the plans.

Positive protection includes concrete barrier and temporary guardrail. Provide positive protection for temporary shoring at locations shown in the plans and as directed. Positive protection is required if temporary shoring is located in the clear zone in accordance with the *AASHTO Roadside Design Guide*.

(A) Cantilever and Braced Shoring

Cantilever shoring consists of steel sheet piles or H-piles with timber lagging. Braced shoring consists of sheet piles or H-piles with timber lagging and bracing such as beams, plates, walers, struts, rakers, etc. Define "piles" as sheet piles or H-piles.

(B) Anchored Shoring

Anchored shoring consists of sheet piles with walers or H-piles with timber lagging anchored with ground or helical anchors. Driven anchors may be accepted at the discretion of the Engineer. A ground anchor consists of a grouted steel bar or multi-strand tendon with an anchorage. A helical anchor consists of a lead section with a central steel shaft and at least one helix steel plate followed by extensions with only central shafts (no helixes) and an anchorage. Anchorages consist of steel bearing plates with washers and hex nuts for bars or steel wedge plates and wedges for strands. Use a prequalified Anchored Wall Contractor to install ground anchors. Define “anchors” as ground, helical or driven anchors.

(C) Temporary MSE Walls

Temporary MSE walls include temporary geosynthetic and wire walls. Define “temporary wall” as a temporary MSE wall and “Temporary Wall Vendor” as the vendor supplying the temporary MSE wall. Define “reinforcement” as geotextile, geogrid, welded wire grid or metallic strip reinforcement.

Temporary geosynthetic walls consist of geotextile or geogrid reinforcement wrapped behind welded wire facing. Define “temporary geotextile wall” as a temporary geosynthetic wall with geotextile reinforcement and “temporary geogrid wall” as a temporary geosynthetic wall with geogrid reinforcement.

Temporary wire walls consist of welded wire grid or metallic strip reinforcement connected to welded wire facing. Define “Wire Wall Vendor” as the vendor supplying the temporary wire wall.

(D) Embedment

Define “embedment” for cantilever, braced and anchored shoring as the pile depth below the grade in front of shoring. Define “embedment” for temporary walls as the wall height below the grade in front of walls.

(E) Positive Protection

Define “unanchored or anchored portable concrete barrier” as portable concrete barrier (PCB) that meets 2018 Roadway Standard Drawing No. 1170.01. Define “concrete barrier” as unanchored or anchored PCB or an approved equal. Define “temporary guardrail” as temporary steel beam guardrail that meets 2018 Roadway Standard Drawing No. 862.02.

Materials

Refer to the *2018 Standard Specifications*.

Item
Concrete Barrier Materials

Section
1170-2

Item	Section
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout	1003
Portland Cement Concrete	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Plates	1072-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials in accordance with Article 106-3 of the *2018 Standard Specifications*. Use Class IV select material for temporary guardrail. Use neat cement grout for Type 2 grout for ground anchors. Use Class A concrete that meets Article 450-2 of the *2018 Standard Specifications* or Type 1 grout for drilled-in piles. Provide untreated timber with a thickness of at least 3 inches and a bending stress of at least 1,000 pounds per square inch for timber lagging. Provide steel bracing that meets ASTM A36.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use A-2-4 soil for backfill around culverts.

(B) Anchors

Store anchor materials on blocking a minimum of 12 inches above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store anchor materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

(1) Ground Anchors

Use high-strength deformed steel bars that meet AASHTO M 275 or seven-wire strands that meet ASTM A886 or Article 1070-5 of the *2018 Standard Specifications*. Splice bars in accordance with Article 1070-9 of the *2018 Standard Specifications*. Do not splice strands. Use bondbreakers, spacers and centralizers that meet Article 6.3.5 of the *AASHTO LRFD Bridge Construction Specifications*.

(2) Helical Anchors

Use helical anchors with an ICC Evaluation Service, Inc. (ICC-ES) report. Provide couplers, thread bar adapters and bolts recommended by the Anchor Manufacturer to connect helical anchors together and to piles.

(3) Anchorages

Provide steel plates for bearing plates and steel washers, hex nuts, wedge plates and wedges recommended by the Anchor Manufacturer.

(C) Temporary Walls

(1) Welded Wire Facing

Use welded wire reinforcement for welded wire facing, struts and wires. For temporary wire walls, provide welded wire facing supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. For temporary wire walls with separate reinforcement and facing components, provide connectors (e.g., bars, clamps, plates, etc.) and fasteners (e.g., bolts, nuts, washers, etc.) required by the Wire Wall Vendor.

(2) Geotextiles

Provide Type 2 geotextile for separation and retention geotextiles. Provide Type 5 geotextile for geotextile reinforcement with ultimate tensile strengths in accordance with the accepted submittals.

(3) Geogrid Reinforcement

Use geogrids with a roll width of at least 4 feet and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

Provide geogrids for geogrid reinforcement with design strengths in accordance with the accepted submittals. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

(4) Welded Wire Grid and Metallic Strip Reinforcement

Provide welded wire grid and metallic strip reinforcement supplied by the Wire Wall Vendor or a manufacturer approved or licensed by the vendor. Use welded wire grid reinforcement (“mesh”, “mats” and “ladders”) that meet Article 1070-3 of the *2018 Standard Specifications* and metallic strip reinforcement (“straps”) that meet ASTM A572 or A1011.

Preconstruction Requirements**(A) Concrete Barrier**

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor’s option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of temporary shoring except for barrier above temporary walls. Concrete barrier with the minimum required clear distance is required above temporary walls.

(B) Temporary Guardrail

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and temporary shoring. At the Contractor’s option or if clear distance for cantilever, braced and anchored shoring is less than 4 feet, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above temporary walls.

(C) Temporary Shoring Designs

Before beginning temporary shoring design, survey existing ground elevations in the vicinity of shoring locations to determine actual design heights (H). Submit PDF files of working drawings and design calculations for temporary shoring designs in accordance with Article 105-2 of the *2018 Standard Specifications*. Submit working drawings showing plan views, shoring profiles, typical sections and details of temporary shoring design and construction sequence. Do not begin shoring construction until a design submittal is accepted.

Have cantilever and braced shoring designed, detailed and sealed by an engineer licensed in the state of North Carolina. Use a prequalified Anchored Wall Design Consultant to design anchored shoring. Provide anchored shoring designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for an Anchored Wall Design Consultant. Include details in anchored shoring working drawings of anchor locations and lock-off loads, unit grout/ground bond strengths for ground anchors or minimum installation torque and torsional strength rating for helical anchors and if necessary, obstructions extending through shoring or interfering with anchors. Include details in the anchored shoring construction sequence of pile and anchor installation, excavation and anchor testing.

Provide temporary wall designs sealed by a Design Engineer licensed in the state of North Carolina and employed or contracted by the Temporary Wall Vendor. Include details in temporary wall working drawings of geotextile and reinforcement types, locations and directions and obstructions extending through walls or interfering with reinforcement.

(1) Soil Parameters

Design temporary shoring for the assumed soil parameters and groundwater elevations shown in the plans. Assume the following soil parameters for shoring backfill:

(a) Unit weight (γ) = 120 pcf;

(b)	Friction Angle (ϕ)	Shoring Backfill
	30°	A-2-4 Soil
	34°	Class II, Type 1 or Class III Select Material
	38°	Class V or VI Select Material

(c) Cohesion (c) = 0 psf.

(2) Traffic Surcharge

Design temporary shoring for a traffic surcharge of 250 pounds per square foot if traffic will be above and within H of shoring. This traffic surcharge does not apply to construction traffic. Design temporary shoring for any construction surcharge if construction traffic will be above and within H of shoring. For LRFD shoring designs, apply traffic (live load) surcharge in accordance with Figure C11.5.5-3 of the *AASHTO LRFD Bridge Design Specifications*.

(3) Cantilever, Braced and Anchored Shoring Designs

Use shoring backfill for fill sections and voids between cantilever, braced and anchored shoring and the critical failure surface. Use concrete or grout for embedded portions of drilled-in H-piles. Do not use drilled-in sheet piles.

Define “top of shoring” for cantilever, braced and anchored shoring as where the grade intersects the back of sheet piles or H-piles and timber lagging. Design cantilever, braced and anchored shoring for a traffic impact load of 2,000 pounds per foot applied 18 inches above top of shoring if concrete barrier is above and next to shoring or temporary guardrail is above and attached to shoring. For anchored shoring designs, apply traffic impact load as horizontal load (P_{HI}) in accordance with Figure 3.11.6.3-2(a) of the *AASHTO LRFD specifications*.

Extend cantilever, braced and anchored shoring at least 32 inches above top of shoring if shoring is designed for traffic impact. Otherwise, extend shoring at least 6 inches above top of shoring.

Design cantilever, braced and anchored shoring for a maximum deflection of 3 inches if the horizontal distance to the closest edge of pavement or structure is less than H. Otherwise, design shoring for a maximum deflection of 6 inches. Design cantilever and braced shoring in accordance with the plans and *AASHTO Guide Specifications for Bridge Temporary Works*.

Design anchored shoring in accordance with the plans and Article 11.9 of the *AASHTO LRFD Bridge Design Specifications*. Use a resistance factor of 0.80 for tensile resistance of anchors with bars, strands or shafts. Extend the unbonded length for ground anchors and the shallowest helix for helical anchors at least 5 feet

behind the critical failure surface. Do not extend anchors beyond right-of-way or easement limits. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with anchors, maintain a clearance of at least 6 inches between obstructions and anchors.

(4) Temporary Wall Designs

Use shoring backfill in the reinforced zone of temporary walls. Separation geotextiles are required between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, separation geotextiles are also required between shoring backfill and backfill or natural ground on top of and at the back of the reinforced zone.

Design temporary walls in accordance with the plans and Article 11.10 of the *AASHTO LRFD Bridge Design Specifications*. Embed temporary walls at least 18 inches except for walls on structures or rock as determined by the Engineer. Use a uniform reinforcement length throughout the wall height of at least $0.7H$ or 6 feet, whichever is longer. Extend the reinforced zone at least 6 inches beyond end of reinforcement. Do not locate the reinforced zone outside right-of-way or easement limits.

Use the simplified method for determining maximum reinforcement loads in accordance with the AASHTO LRFD specifications. For geotextile reinforcement, use geotextile properties approved by the Department or default values in accordance with the AASHTO LRFD specifications. For geogrid reinforcement, use approved geogrid properties available from the website shown elsewhere in this provision. If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement. Use geosynthetic properties for the direction reinforcement will be installed, a 3-year design life and shoring backfill to be used in the reinforced zone.

Do not use more than 4 different reinforcement strengths for each temporary geosynthetic wall. Design temporary geotextile walls for a reinforcement coverage ratio (R_c) of 1.0. For temporary geogrid walls with an R_c of less than 1.0, use a maximum horizontal clearance between geogrids of 3 feet and stagger reinforcement so geogrids are centered over gaps in the reinforcement layer below.

For temporary geosynthetic walls, use “L” shaped welded wire facing with 18 to 24 inch long legs. Locate geotextile or geogrid reinforcement so reinforcement layers are at the same level as the horizontal legs of welded wire facing. Use vertical reinforcement spacing equal to facing height. Wrap geotextile or geogrid reinforcement behind welded wire facing and extend reinforcement at least 3 feet back behind facing into shoring backfill.

For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing with

a connection approved by the Department. For temporary geogrid and wire walls, retain shoring backfill at welded wire facing with retention geotextiles and extend geotextiles at least 3 feet back behind facing into backfill.

(D) Preconstruction Meeting

The Engineer may require a shoring preconstruction meeting to discuss the construction, inspection and testing of the temporary shoring. If required and if this meeting occurs before all shoring submittals have been accepted, additional preconstruction meetings may be required before beginning construction of temporary shoring without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Shoring Contractor Superintendent will attend preconstruction meetings.

Construction Methods

Control drainage during construction in the vicinity of shoring. Direct run off away from shoring and shoring backfill. Contain and maintain backfill and protect material from erosion.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *2018 Standard Specifications* and 2018 Roadway Standard Drawing Nos. 862.01, 862.02 and 862.03.

(A) Tolerances

Construct shoring with the following tolerances:

- (1) Horizontal wires of welded wire facing are level in all directions,
- (2) Shoring location is within 6 inches of horizontal and vertical alignment shown in the accepted submittals, and
- (3) Shoring plumbness (batter) is not negative and within 2 degrees of vertical.

(B) Cantilever, Braced and Anchored Shoring Installation

If overexcavation behind cantilever, braced or anchored shoring is shown in the accepted submittals, excavate before installing piles. Otherwise, install piles before excavating for shoring. Install cantilever, braced or anchored shoring in accordance with the construction sequence shown in the accepted submittals. Remove piles and if applicable, timber lagging when shoring is no longer needed.

(1) Pile Installation

Install piles with the minimum required embedment and extension in accordance with Subarticles 450-3(D) and 450-3(E) of the *2018 Standard Specifications* except

that a pile driving equipment data form is not required. Piles may be installed with a vibratory hammer as approved by the Engineer.

Do not splice sheet piles. Use pile excavation to install drilled-in H-piles. After filling holes with concrete or grout to the elevations shown in the accepted submittals, remove any fluids and fill remaining portions of holes with flowable fill. Cure concrete or grout at least 7 days before excavating.

Notify the Engineer if refusal is reached before pile excavation or driven piles attain the minimum required embedment. When this occurs, a revised design submittal may be required.

(2) Excavation

Excavate in front of piles from the top down in accordance with the accepted submittals. For H-piles with timber lagging and braced and anchored shoring, excavate in staged horizontal lifts with a maximum height of 5 feet. Remove flowable fill and material in between H-piles as needed to install timber lagging. Position lagging with at least 3 inches of contact in the horizontal direction between the lagging and pile flanges. Do not excavate the next lift until timber lagging for the current lift is installed and if applicable, bracing and anchors for the current lift are accepted. Backfill behind cantilever, braced or anchored shoring with shoring backfill.

(3) Anchor Installation

If applicable, install foundations located behind anchored shoring before installing anchors. Fabricate and install ground anchors in accordance with the accepted submittals, Articles 6.4 and 6.5 of the *AASHTO LRFD Bridge Construction Specifications* and the following unless otherwise approved:

- (a) Materials in accordance with this provision are required instead of materials conforming to Articles 6.4 and 6.5.3 of the AASHTO LRFD Specifications,
- (b) Encapsulation-protected ground anchors in accordance with Article 6.4.1.2 of the AASHTO LRFD specifications are not required, and
- (c) Corrosion protection for unbonded lengths of ground anchors and anchorage covers are not required.
- (d) Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4, Mud Balance) and ASTM C939 (Flow Cone), respectively.

Install helical anchors in accordance with the accepted submittals and Anchor Manufacturer's instructions. Measure torque during installation and do not exceed the torsional strength rating of the helical anchor. Attain the minimum required installation torque and penetration before terminating anchor installation. When replacing a helical anchor, embed last helix of the replacement anchor at least 3 helix plate diameters past the location of the first helix of the previous anchor.

(4) Anchor Testing

Proof test and lock-off anchors in accordance with the accepted submittals and Article 6.5.5 of the *AASHTO LRFD Bridge Construction Specifications* except for the acceptance criteria in Article 6.5.5.5. For the AASHTO LRFD specifications, "ground anchor" refers to a ground or helical anchor and "tendon" refers to a bar, strand or shaft.

(a) Anchor Acceptance

Anchor acceptance is based in part on the following criteria.

- (i) For ground and helical anchors, total movement is less than 0.04 inches between the 1 and 10 minute readings or less than 0.08 inches between the 6 and 60 minute readings.
- (ii) For ground anchors, total movement at maximum test load exceeds 80% of the theoretical elastic elongation of the unbonded length.

(b) Anchor Test Results

Submit PDF files of anchor test records including movement versus load plots for each load increment within 24 hours of completing each row of anchors. The Engineer will review the test records to determine if the anchors are acceptable.

If the Engineer determines an anchor is unacceptable, revise the anchor design or installation methods. Submit a revised anchored shoring design for acceptance and provide an acceptable anchor with the revised design or installation methods. If required, replace the anchor or provide additional anchors with the revised design or installation methods.

(C) Temporary Wall Installation

Excavate as necessary for temporary walls in accordance with the plans and accepted submittals. If applicable, install foundations located in the reinforced zone before placing shoring backfill or reinforcement unless otherwise approved. Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or reinforcement until excavation dimensions and foundation material are approved.

Erect welded wire facing so the wall position is as shown in the plans and accepted submittals. Set welded wire facing adjacent to each other in the horizontal and vertical

direction to completely cover the wall face with facing. Stagger welded wire facing to create a running bond by centering facing over joints in the row below.

Wrap geotextile reinforcement and retention geotextiles behind welded wire facing as shown in the plans and accepted submittals and cover geotextiles with at least 3" of shoring backfill. Overlap adjacent geotextile reinforcement and retention and separation geotextiles at least 18 inches with seams oriented perpendicular to the wall face. Hold geotextiles in place with wire staples or anchor pins as needed.

Place reinforcement within 3 inches of locations shown in the plans and accepted submittals. Before placing shoring backfill, pull reinforcement taut so it is in tension and free of kinks, folds, wrinkles or creases. Install reinforcement with the direction shown in the plans and accepted submittals. For temporary wire walls with separate reinforcement and facing components, attach welded wire grid or metallic strip reinforcement to welded wire facing as shown in the accepted submittals. Do not splice or overlap reinforcement so seams are parallel to the wall face. Contact the Engineer when unanticipated existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with reinforcement.

Place shoring backfill in the reinforced zone in 8 to 10 inch thick lifts. Compact A-2-4 soil and Class II, Type 1 and Class III select material in accordance with Subarticle 235-3(C) of the *2018 Standard Specifications*. Use only hand operated compaction equipment to compact backfill within 3 feet of welded wire facing. At a distance greater than 3 feet, compact shoring backfill with at least 4 passes of an 8 to 10 ton vibratory roller in a direction parallel to the wall face. Smooth wheeled or rubber tired rollers are also acceptable for compacting backfill. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage reinforcement when placing and compacting shoring backfill. End dumping directly on geotextile or geogrid reinforcement is not permitted. Do not operate heavy equipment on reinforcement until it is covered with at least 8 inches of shoring backfill. Replace any damaged reinforcement to the satisfaction of the Engineer.

Backfill for temporary walls outside the reinforced zone in accordance with Article 410-8 of the *2018 Standard Specifications*. Bench temporary walls into the sides of excavations where applicable. For temporary geosynthetic walls with top of wall within 5 feet of finished grade, remove top facing and incorporate top reinforcement layer into fill when placing fill in front of wall. Temporary walls remain in place permanently unless otherwise required.

Measurement and Payment

Temporary Shoring will be measured and paid in square feet. Temporary walls will be measured as the square feet of exposed wall face area. Cantilever, braced or anchored shoring will be measured as the square feet of exposed shoring face area with the shoring height equal to the difference between the top and bottom of shoring elevations. Define “top of shoring” as where the grade intersects the back of sheet piles or H-piles and timber lagging. Define “bottom of shoring” as where the grade intersects front of sheet piles or H-piles and timber lagging. No measurement will be made for any embedment, shoring extension above top of shoring or pavement thickness above temporary walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing shoring designs, submittals and materials, excavating, backfilling, hauling and removing excavated materials and supplying all labor, tools, equipment and incidentals necessary to construct temporary shoring.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor’s convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *2018 Standard Specifications*. No additional payment will be made for anchoring PCB for temporary shoring. Costs for anchoring PCB will be incidental to temporary shoring.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *2018 Standard Specifications*.

Payment will be made under:

Pay Item
Temporary Shoring

Pay Unit
Square Foot

EXTRUDED THERMOPLASTIC PAVEMENT MARKING THICKNESS:

3-19-19

1205

SP12 R05

Revise the *2018 Standard Specifications* as follows:

Page 12-6, Subarticle 1205-4(A)(1) General, lines 5-8, delete the second sentence and replace with the following:

Use application equipment that provides multiple width settings ranging from 4 inches to 12 inches and multiple thickness settings to achieve a minimum pavement marking thickness of 0.090 inch above the surface of the pavement.

Page 12-7, Table 1205-3, THICKNESS REQUIREMENTS FOR THERMOPLASTIC, replace with the following:

TABLE 1205-3 MINIMUM THICKNESS REQUIREMENTS FOR THERMOPLASTIC	
Thickness	Location
240 mils	In-lane and shoulder-transverse pavement markings (rumble strips). May be placed in 2 passes.
90 mils	Center lines, skip lines, transverse bands, mini-skip lines, characters, bike lane symbols, crosswalk lines, edge lines, gore lines, diagonals, and arrow symbols

PERMANENT SEEDING AND MULCHING:

(7-1-95)

1660

SP16 R02

The Department desires that permanent seeding and mulching be established on this project as soon as practical after slopes or portions of slopes have been graded. As an incentive to obtain an early stand of vegetation on this project, the Contractor's attention is called to the following:

For all permanent seeding and mulching that is satisfactorily completed in accordance with the requirements of Section 1660 in the *2018 Standard Specifications* and within the following percentages of elapsed contract times, an additional payment will be made to the Contractor as an incentive additive. The incentive additive will be determined by multiplying the number of acres of seeding and mulching satisfactorily completed times the contract unit bid price per acre for Seeding and Mulching times the appropriate percentage additive.

Percentage of Elapsed Contract Time	Percentage Additive
0% - 30%	30%
30.01% - 50%	15%

Percentage of elapsed contract time is defined as the number of calendar days from the date of availability of the contract to the date the permanent seeding and mulching is acceptably completed divided by the total original contract time.

STANDARD SPECIAL PROVISION
AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS

(5-20-08)

Z-2

General Statute 143C-6-11. (h) Highway Appropriation is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

STANDARD SPECIAL PROVISION
NCDOT GENERAL SEED SPECIFICATION FOR SEED QUALITY

(5-17-11)

Z-3

Seed shall be sampled and tested by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory. When said samples are collected, the vendor shall supply an independent laboratory report for each lot to be tested. Results from seed so sampled shall be final. Seed not meeting the specifications shall be rejected by the Department of Transportation and shall not be delivered to North Carolina Department of Transportation warehouses. If seed has been delivered it shall be available for pickup and replacement at the supplier's expense.

Any re-labeling required by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory, that would cause the label to reflect as otherwise specified herein shall be rejected by the North Carolina Department of Transportation.

Seed shall be free from seeds of the noxious weeds Johnsongrass, Balloonvine, Jimsonweed, Witchweed, Itchgrass, Serrated Tussock, Showy Crotalaria, Smooth Crotalaria, Sickledod, Sandbur, Wild Onion, and Wild Garlic. Seed shall not be labeled with the above weed species on the seed analysis label. Tolerances as applied by the Association of Official Seed Analysts will NOT be allowed for the above noxious weeds except for Wild Onion and Wild Garlic.

Tolerances established by the Association of Official Seed Analysts will generally be recognized. However, for the purpose of figuring pure live seed, the found pure seed and found germination percentages as reported by the North Carolina Department of Agriculture and Consumer Services, Seed Testing Laboratory will be used. Allowances, as established by the NCDOT, will be recognized for minimum pure live seed as listed on the following pages.

The specifications for restricted noxious weed seed refers to the number per pound as follows:

<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. Of Seed</u>	<u>Restricted Noxious Weed</u>	<u>Limitations per Lb. of Seed</u>
Blessed Thistle	4 seeds	Cornflower (Ragged Robin)	27 seeds
Cocklebur	4 seeds	Texas Panicum	27 seeds
Spurred Anoda	4 seeds	Bracted Plantain	54 seeds
Velvetleaf	4 seeds	Buckhorn Plantain	54 seeds
Morning-glory	8 seeds	Broadleaf Dock	54 seeds
Corn Cockle	10 seeds	Curly Dock	54 seeds
Wild Radish	12 seeds	Dodder	54 seeds
Purple Nutsedge	27 seeds	Giant Foxtail	54 seeds
Yellow Nutsedge	27 seeds	Horsenettle	54 seeds
Canada Thistle	27 seeds	Quackgrass	54 seeds
Field Bindweed	27 seeds	Wild Mustard	54 seeds
Hedge Bindweed	27 seeds		

Seed of Pensacola Bahiagrass shall not contain more than 7% inert matter, Kentucky Bluegrass, Centipede and Fine or Hard Fescue shall not contain more than 5% inert matter whereas a maximum of 2% inert matter will be allowed on all other kinds of seed. In addition, all seed shall

not contain more than 2% other crop seed nor more than 1% total weed seed. The germination rate as tested by the North Carolina Department of Agriculture shall not fall below 70%, which includes both dormant and hard seed. Seed shall be labeled with not more than 7%, 5% or 2% inert matter (according to above specifications), 2% other crop seed and 1% total weed seed.

Exceptions may be made for minimum pure live seed allowances when cases of seed variety shortages are verified. Pure live seed percentages will be applied in a verified shortage situation. Those purchase orders of deficient seed lots will be credited with the percentage that the seed is deficient.

FURTHER SPECIFICATIONS FOR EACH SEED GROUP ARE GIVEN BELOW:

Minimum 85% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 83% pure live seed will not be approved.

Sericea Lespedeza
Oats (seeds)

Minimum 80% pure live seed; maximum 1% total weed seed; maximum 2% total other crop; maximum 144 restricted noxious weed seed per pound. Seed less than 78% pure live seed will not be approved.

Tall Fescue (all approved varieties)	Bermudagrass
Kobe Lespedeza	Browntop Millet
Korean Lespedeza	German Millet – Strain R
Weeping Lovegrass	Clover – Red/White/Crimson
Carpetgrass	

Minimum 78% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 76% pure live seed will not be approved.

Common or Sweet Sundangrass

Minimum 76% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 restricted noxious weed seed per pound. Seed less than 74% pure live seed will not be approved.

Rye (grain; all varieties)
Kentucky Bluegrass (all approved varieties)
Hard Fescue (all approved varieties)
Shrub (bicolor) Lespedeza

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 144 noxious weed seed per pound. Seed less than 70% pure live seed will not be approved.

Centipedegrass	Japanese Millet
Crownvetch	Reed Canary Grass
Pensacola Bahiagrass	Zoysia
Creeping Red Fescue	

Minimum 70% pure live seed; maximum 1% total weed seed; maximum 2% total other crop seed; maximum 5% inert matter; maximum 144 restricted noxious weed seed per pound.

Barnyard Grass
Big Bluestem
Little Bluestem
Bristly Locust
Birdsfoot Trefoil
Indiangrass
Orchardgrass
Switchgrass
Yellow Blossom Sweet Clover

STANDARD SPECIAL PROVISION**ERRATA**

(10-16-18) (Rev.1-15-19)

Z-4

Revise the *2018 Standard Specifications* as follows:

Division 6

Page 6-7, Article 609-1 DESCRIPTION, line 29, replace article number “609-10” with “609-9”.

Division 7

Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4, replace article number “725-1” with “724-4”.

Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10, replace article number “725-1” with “725-3”.

Division 10

Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2, replace “Table 6^D” with “Table 7^D” and **Permittivity, Type 3^B,** replace “Table 7^D” with “Table 8^D”.

Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1, replace article number “1080-50” with “1080-10”.

Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5, replace article number “1080-61” with “1080-11”.

Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22, replace article number “1080-72” with “1080-12”.

Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25, replace article number “1080-83” with “1080-13”.

Division 17

Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44, replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25”) Linear Foot

STANDARD SPECIAL PROVISION**PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)**

(3-18-03) (Rev. 5-21-19)

Z-04a

Within Quarantined Area

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

Originating in a Quarantined County

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

Contact

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or <https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

Regulated Articles Include

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

STANDARD SPECIAL PROVISION**MINIMUM WAGES**

(7-21-09)

Z-5

FEDERAL: The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

STATE: The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

STANDARD SPECIAL PROVISION**TITLE VI AND NONDISCRIMINATION:**

(6-28-77)(Rev 6/19/2018)

Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

(1) **Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

(a) Compliance with Regulations

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

(b) Nondiscrimination

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

(d) Information and Reports

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts,

Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:

- (i) Withholding payments to the contractor under the contract until the contractor complies; and/or
- (ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

(a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:

1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.
3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

"The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§

2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award.”

4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
 5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
 6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.
- (b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))
- (c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))
- (d) The Contractor is responsible for notifying subcontractors of NCDOT’s External Discrimination Complaints Process.
1. Applicability
Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
 2. Eligibility
Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
 3. Time Limits and Filing Options
Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
 - (i) The date of the alleged act of discrimination; or
 - (ii) The date when the person(s) became aware of the alleged discrimination; or
 - (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
 - Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
 - US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070
4. Format for Complaints
- Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant's name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.
5. Discrimination Complaint Form
- Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.
6. Complaint Basis
- Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). "Basis" refers to the complainant's membership in a protected group category.

**TABLE 103-1
COMPLAINT BASIS**

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. (<i>Executive Order 13166</i>)
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin (<i>Limited English Proficiency</i>)	Place of birth. Citizenship is not a factor. (<i>Discrimination based on language or a person's accent is also covered</i>)	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual. <i>Note: Sex under this program does not include sexual orientation.</i>	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990

Religion (in the context of employment) <i>(Religion/ Creed in all aspects of any aviation or transit-related construction)</i>	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. Note: Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. (49 U.S.C. 5332(b); 49 U.S.C. 47123)
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(3) Pertinent Nondiscrimination Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

- (a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- (b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- (c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- (d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- (e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- (f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- (g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- (h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- (i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- (j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with

disproportionately high and adverse human health or environmental effects on minority and low-income populations;

- (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
- (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).

(4) Additional Title VI Assurances

***The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

(a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)

The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].*

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:
 - (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. *
3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

(c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)

The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):

1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. *
3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. *

(*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

STANDARD SPECIAL PROVISION**ON-THE-JOB TRAINING**

(10-16-07) (Rev. 4-21-15)

Z-10

Description

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

Minorities and Women

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

Assigning Training Goals

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

Records and Reports

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

Trainee Interviews

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

Trainee Wages

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

Achieving or Failing to Meet Training Goals

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

Measurement and Payment

No compensation will be made for providing required training in accordance with these contract documents.

PROJECT SPECIAL PROVISIONS

GEOTECHNICAL

REINFORCED SOIL SLOPES - (1/16/2018)

GT-1.1 - GT-1.4

TEMPORARY SOIL NAIL WALLS - (1/16/2018)

GT-2.1 - GT-2.9

STANDARD SHORING - (1/16/2018)

GT-3.1 - GT-3.4

GEOTEXTILE FOR PAVEMENT STABILIZATION - (5/15/2018)

GT-4.1 - GT-4.2

DocuSigned by:
Geotechnical Engineering Unit
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1/23/2019

REINFORCED SOIL SLOPES:**(1-16-18)****Description**

Construct reinforced soil slopes (RSS) consisting of select material and geogrid reinforcement in the reinforced zone with erosion control products on slope faces. Slope erosion control includes matting with shoulder and slope borrow or geocells with compost blankets. Construct RSS in accordance with the contract and if included in the plans, Geotechnical Standard Detail No. 1802.01 or 1802.02. RSS are required to reinforce embankments and stabilize slopes at locations shown in the plans and as directed. Define “geogrids” as primary or secondary geogrids and “matting” as coir fiber mats or matting for erosion control. Define “standard RSS” as a RSS that meets either of the standard reinforced soil slope drawings (Geotechnical Standard Detail No. 1802.01 or 1802.02).

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geogrids	1056
Matting for Erosion Control	1060-8
Select Materials	1016
Shoulder and Slope Borrow	1019-2

Unless required otherwise in the plans, use Class I, II or III select material in the reinforced zone of RSS. Use geocells that meet the *Cellular Confinement Systems* provision, seeded compost blankets that meet the *Compost Blanket* provision and coir fiber mats that meet the *Coir Fiber Mat* provision.

Handle and store geogrids in accordance with Article 1056-2 of the *Standard Specifications*. Define “machine direction” (MD) and “cross-machine direction” (CD) for geogrids per Article 1056-3 of the *Standard Specifications*. Provide Type 1 material certifications and identify geogrids in accordance with Article 1056-3 of the *Standard Specifications*.

Use geogrids with a roll width of at least 4 ft. Use primary geogrids with an “approved” status code and secondary geogrids with an “approved” or “approved for provisional use” status code. Do not use geogrids with an “approved for provisional use” status code for primary geogrids. The list of approved geogrids is available from:

connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

Provide geogrids with design strengths in accordance with the plans. For standard RSS and based on actual RSS angle and height and select material to be used in the reinforced zone at each standard RSS location, provide geogrids with long-term design strengths in accordance with Geotechnical Standard Detail No. 1802.01 or 1802.02. Geogrids are typically approved for ultimate tensile strengths in the MD and CD or long-term design strengths for a 75-year design life in the MD based on material type. Define material type from the website above for select material as follows:

Material Type	Select Material
Borrow	Class I Select Material
Fine Aggregate	Class II or III Select Material

If the website does not list a long-term design strength in the MD for an approved geogrid, do not use the geogrid for primary geogrid. If the website does not list a long-term design strength in the CD for an approved geogrid, use a long-term design strength equal to the ultimate tensile strength divided by 7 for the secondary geogrid.

Construction Methods

Before starting RSS construction, the Engineer may require a preconstruction meeting to discuss the construction and inspection of the RSS. If this meeting is required and occurs before all RSS submittals and material certifications have been accepted, additional preconstruction meetings may be required before beginning construction of RSS without accepted submittals. The Resident or District Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and RSS Contractor Superintendent will attend preconstruction meetings.

Control drainage during construction in the vicinity of RSS. Direct run off away from RSS, select material and backfill. Contain and maintain select material and backfill and protect material from erosion.

Excavate as necessary for RSS in accordance with the contract. Maintain a horizontal clearance of at least 12" between the ends of primary geogrids and limits of reinforced zone as shown in the plans. When excavating existing slopes, bench slopes in accordance with Subarticle 235-3(A) of the *Standard Specifications*. Notify the Engineer when excavation is complete. Do not place primary geogrids until excavation dimensions and in-situ material are approved.

Place geogrids within 3" of locations shown in the plans. Install geogrids with the orientation, dimensions and number of layers shown in the plans. Before placing select material, pull geogrids taut so they are in tension and free of kinks, folds, wrinkles or creases. Contact the Engineer when existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with geogrids. If necessary, the top geogrid layer may be lowered up to 9" to avoid obstructions. Extend geogrids to slope faces.

Install primary geogrids with the MD perpendicular to the embankment centerline. The MD is the direction of the length or long dimension of the geogrid roll. Unless shown otherwise in the plans, do not splice or overlap primary geogrids in the MD so splices or overlaps are parallel to toe of RSS. Unless shown otherwise in the plans and except for clearances at the ends of primary geogrids, completely cover select material at each primary geogrid layer with geogrid so primary geogrids are adjacent to each other in the CD, i.e., perpendicular to the MD. The CD is the direction of the width or short dimension of the geogrid roll.

Install secondary geogrids with MD parallel to toe of RSS. Secondary geogrids should be continuous for each secondary geogrid layer. If secondary geogrid roll length is too short, overlap ends of secondary geogrid rolls at least 12" in the direction that select material will be placed to prevent lifting the edge of the top geogrid.

Place select material in the reinforced zone in 8" to 10" thick lifts and compact material in accordance with Subarticle 235-3(C) of the *Standard Specifications*. For RSS steeper than 1.5:1 (H:V), compact slope faces with an approved method. Do not use sheepsfoot, grid rollers or other types of compaction equipment with feet. Do not displace or damage geogrids when placing and compacting select material. End dumping directly on geogrids is not permitted. Do not operate heavy equipment on geogrids until they are covered with at least 8" of select material. To prevent damaging geogrids, minimize turning and avoid sudden braking and sharp

turns with compaction equipment. Replace any damaged geogrids to the satisfaction of the Engineer. Construct remaining portions of embankments outside the reinforced zone in accordance with Section 235 of the *Standard Specifications*.

Plate slope faces of RSS with at least 6" of shoulder and slope borrow except when using geocells for slope erosion control. Install slope erosion control as shown in the plans and as soon as possible to prevent damage to slope faces of RSS. If damage occurs, repair RSS and slope faces to the satisfaction of the Engineer before seeding or installing erosion control products. For matting, seed slope faces and cover shoulder and slope borrow with coir fiber mat or matting for erosion control as shown in the plans in accordance with the *Coir Fiber Mat* provision or Section 1631 of the *Standard Specifications*, respectively. Install geocells filled with seeded compost in accordance with the accepted submittals and the *Cellular Confinement Systems* and *Compost Blanket* provisions. Maintain slope erosion control until vegetation is established.

Measurement and Payment

Reinforced Soil Slopes will be measured and paid in square yards. RSS will be measured along the slope faces of RSS before installing slope erosion control as the square yards of RSS. No payment will be made for repairing damaged RSS or slope faces.

The contract unit price for *Reinforced Soil Slopes* will be full compensation for providing labor, tools, equipment and RSS materials, compacting select materials and supplying and placing geogrids, select material, shoulder and slope borrow and any incidentals necessary to construct RSS except for erosion control products. The contract unit price for *Reinforced Soil Slopes* will also be full compensation for excavating and hauling and removing excavated materials to install RSS.

Coir fiber mat and matting for erosion control will be measured and paid in accordance with the *Coir Fiber Mat* provision and Article 1631-4 of the *Standard Specifications*, respectively. Geocells and seeded compost blankets will be will be measured and paid in accordance with the *Cellular Confinement Systems* and *Compost Blanket* provisions, respectively.

Payment will be made under:

Pay Item

Reinforced Soil Slopes

Pay Unit

Square Yard



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10/22/2018

TEMPORARY SOIL NAIL WALLS:**(1-16-18)****Description**

Construct temporary soil nail walls consisting of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face. A soil nail consists of a steel bar grouted in a drilled hole inclined at an angle below horizontal. At the Contractor's option, use temporary soil nail walls instead of temporary shoring for full cut sections. Design and construct temporary soil nail walls based on actual elevations and wall dimensions in accordance with the contract and accepted submittals. Use a prequalified Anchored Wall Contractor to construct temporary soil nail walls. Define "soil nail wall" as a temporary soil nail wall and "Soil Nail Wall Contractor" as the Anchored Wall Contractor installing soil nails and applying shotcrete. Define "nail" as a soil nail.

Provide positive protection for soil nail walls at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geocomposites	1056
Neat Cement Grout, Type 2	1003
Reinforcing Steel	1070
Shotcrete	1002
Select Material, Class IV	1016
Steel Plates	1072-2

Use Class IV select material for temporary guardrail. Provide soil nails consisting of grouted steel bars and nail head assemblies. Use deformed steel bars that meet AASHTO M 275 or M 31, Grade 60 or 75. Splice bars in accordance with Article 1070-9 of the *Standard Specifications*.

Fabricate centralizers from schedule 40 PVC plastic pipe or tube, steel or other material not detrimental to steel bars (no wood). Size centralizers to position bars within 1" of drill hole centers and allow tremies to be inserted to ends of holes. Use centralizers that do not interfere with grout placement or flow around bars.

Provide nail head assemblies consisting of nuts, washers and bearing plates. Use steel plates for bearing plates and steel washers and hex nuts recommended by the Soil Nail Manufacturer.

Provide Type 6 material certifications for soil nail materials in accordance with Article 106-3 of the *Standard Specifications*. Store steel materials on blocking at least 12" above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Load, transport, unload and store soil nail wall materials so materials are kept clean and free of damage. Bent, damaged or defective materials will be rejected.

Preconstruction Requirements**(A) Concrete Barrier**

Define "clear distance" behind concrete barrier as the horizontal distance between the

barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor's option or if the minimum required clear distance is not available, set concrete barrier next to and up against traffic side of soil nail walls except for barrier above walls. Concrete barrier with the minimum required clear distance is required above soil nail walls.

(B) Temporary Guardrail

Define "clear distance" behind temporary guardrail as the horizontal distance between guardrail posts and soil nail walls. At the Contractor's option or if clear distance for soil nail walls is less than 4 ft, use temporary guardrail with 8 ft posts and a clear distance of at least 2.5 ft. Place ABC in clear distance and around guardrail posts instead of pavement.

(C) Soil Nail Wall Designs

Before beginning soil nail wall design, survey existing ground elevations in the vicinity of wall locations to determine actual design heights (H). Use a prequalified Anchored Wall Design Consultant to design soil nail walls. Provide designs sealed by a Design Engineer approved as a Geotechnical Engineer (key person) for the Anchored Wall Design Consultant.

Submit PDF files of working drawings and design calculations for soil nail wall designs in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles, typical sections and details of soil nail wall design and construction sequence. Include details in working drawings of soil nail locations, unit grout/ground bond strengths, shotcrete reinforcement and if necessary, obstructions extending through walls or interfering with nails. Include details in construction sequence of excavation, grouting, installing reinforcement, nail testing and shotcreting with mix designs and shotcrete nozzleman certifications. Do not begin soil nail wall construction until a design submittal is accepted.

Design soil nail walls in accordance with the plans and allowable stress design method in the *FHWA Geotechnical Engineering Circular No. 7 "Soil Nail Walls"* (Publication No. FHWA-IF-03-017) unless otherwise required.

Design soil nails that meet the following unless otherwise approved:

- (1) Horizontal and vertical spacing of at least 3 ft,
- (2) Inclination of at least 12° below horizontal and
- (3) Diameter of 4" to 10".

Do not extend nails beyond right-of-way or easement limits. If existing or future obstructions such as foundations, pavements, pipes, inlets or utilities will interfere with nails, maintain a clearance of at least 6" between obstructions and nails.

Design soil nail walls for a traffic surcharge of 250 psf if traffic will be above and within H of walls. This traffic surcharge does not apply to construction traffic. Design soil nail walls for any construction surcharge if construction traffic will be above and within H of walls. For temporary guardrail with 8 ft posts above soil nail walls, analyze walls for a horizontal load of 300 lb/ft of wall.

Place geocomposite drain strips with a horizontal spacing of no more than 10 ft and center strips between adjacent nails. Attach drain strips to excavation faces. Use shotcrete at least 4" thick and reinforce shotcrete with #4 waler bars around nail heads. Two waler bars (one on each side of nail head) in the horizontal and vertical directions are required for a total of 4 bars per nail.

(D) Preconstruction Meeting

Before starting soil nail wall construction, hold a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. If this meeting occurs before all soil nail wall submittals have been accepted, additional preconstruction meetings may be required before beginning construction of soil nail walls without accepted submittals. The Resident, District or Bridge Maintenance Engineer, Area Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent will attend preconstruction meetings.

(E) Preconstruction Meeting

Before beginning wall construction, provide preconstruction test panels in accordance with Subarticle 1002-3(D) of the *Standard Specifications*.

Construction Methods

Control drainage during construction in the vicinity of soil nail walls. Direct run off away from soil nail walls and areas above and behind walls.

Install foundations located behind soil nail walls before beginning wall construction. Do not excavate behind soil nail walls. If overexcavation occurs, repair walls with an approved method and a revised soil nail wall design may be required.

Install positive protection in accordance with the contract and accepted submittals. Use PCB in accordance with Section 1170 of the *Standard Specifications* and Roadway Standard Drawing No. 1170.01. Use temporary guardrail in accordance with Section 862 of the *Standard Specifications* and Roadway Standard Drawing No. 862.01, 862.02 and 862.03.

(A) Excavation

Excavate for soil nail walls from the top down in accordance with the accepted submittals. Excavate in staged horizontal lifts with no negative batter (excavation face leaning forward). Excavate lifts in accordance with the following:

- (1) Heights not to exceed vertical nail spacing,
- (2) Bottom of lifts no more than 3 ft below nail locations for current lift and
- (3) Horizontal and vertical alignment within 6" of location shown in the accepted submittals.

Remove any cobbles, boulders, rubble or debris that will protrude more than 2" into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Apply shotcrete to excavation faces within 24 hours of excavating each lift unless otherwise approved. Shotcreting may be delayed if it can be demonstrated that delays will not adversely affect excavation stability. If excavation faces will be exposed for

more than 24 hours, use polyethylene sheets anchored at top and bottom of lifts to protect excavation faces from changes in moisture content.

If an excavation becomes unstable at any time, suspend soil nail wall construction and temporarily stabilize the excavation by immediately placing an earth berm up against the unstable excavation face. When this occurs, repair walls with an approved method and a revised soil nail wall design may be required.

Do not excavate the next lift until nail installations and testing and shotcrete application for the current lift are accepted and grout and shotcrete for the current lift have cured at least 3 days and 1 day, respectively.

(B) Soil Nails

Drill and grout nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements or fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take corrective action to minimize movement. If property damage occurs, make repairs with an approved method and a revised soil nail wall design may be required.

(1) Drilling

Use drill rigs of the sizes necessary to install soil nails and with sufficient capacity to drill through whatever materials are encountered. Drill straight and clean holes with the dimensions and inclination shown in the accepted submittals. Drill holes within 6" of locations and 2° of inclination shown in the accepted submittals unless otherwise approved.

Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

(2) Steel Bars

Center steel bars in drill holes with centralizers. Securely attach centralizers along bars at no more than 8 ft centers. Attach uppermost and lowermost centralizers 18" from excavation faces and ends of holes.

Do not insert steel bars into drill holes until hole locations, dimensions, inclination and cleanliness are approved. Do not vibrate, drive or otherwise force bars into holes. If a steel bar cannot be completely and easily inserted into a drill hole, remove the bar and clean or redrill the hole.

(3) Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and any other equipment in contact with grout before use. Measure grout temperature, density and flow during grouting with at least the same frequency grout cubes are made for compressive strength. Perform density and flow field tests in the presence of the Engineer in accordance with American National Standards Institute/American Petroleum Institute Recommended Practice 13B-1 (Section 4,

Mud Balance) and ASTM C939 (Flow Cone), respectively.

Inject grout at the lowest point of drill holes through tremies, e.g., grout tubes, casings, hollow-stem augers or drill rods, in one continuous operation. Fill drill holes progressively from ends of holes to excavation faces and withdraw tremies at a slow even rate as holes are filled to prevent voids in grout. Extend tremies into grout at least 5 ft at all times except when grout is initially placed in holes.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for test nails. Remove any temporary casings as grout is placed and record grout volume for each drill hole.

(4) **Nail Heads**

Install nail head assemblies after shotcreting. Before shotcrete reaches initial set, seat bearing plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on mortar pads so nail heads are evenly loaded.

(C) **Drain Strips**

Install geocomposite drain strips as shown in the accepted submittals. Before installing shotcrete reinforcement, place drain strips with the geotextile side against excavation faces. For highly irregular faces and at the discretion of the Engineer, drain strips may be placed after shotcreting over weep holes through the shotcrete. Hold drain strips in place with anchor pins so strips are in continuous contact with surfaces to which they are attached and allow for full flow the entire height of soil nail walls. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips at least 12" so flow is not impeded. Cut off excess drain strip length and expose strip ends below shotcrete when soil nail wall construction is complete.

(D) **Shotcrete**

Clean ungrouted zones of drill holes and excavation faces of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Install shotcrete reinforcement in accordance with the contract and accepted submittals. Secure reinforcing steel so shooting does not displace or vibrate reinforcement. Install approved thickness gauges on 5 ft centers in the horizontal and vertical directions to measure shotcrete thickness.

Apply shotcrete in accordance with the contract, accepted submittals and Subarticle 1002-3(F) of the *Standard Specifications*. Use approved shotcrete nozzlemen who made satisfactory preconstruction test panels to apply shotcrete. Direct shotcrete at right angles to excavation faces except when shooting around reinforcing steel. Rotate nozzle steadily in small circular patterns and apply shotcrete from bottom of lifts up.

Make shotcrete surfaces uniform and free of sloughing or sagging. Completely fill ungrouted zones of drill holes and any other voids with shotcrete. Taper construction joints to a thin edge over a horizontal distance of at least the shotcrete thickness. Wet joint surfaces before shooting adjacent sections.

Repair surface defects as soon as possible after shooting. Remove any shotcrete which

lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer. Protect shotcrete from freezing and rain until shotcrete reaches initial set.

(E) Construction Records

Provide 2 copies of soil nail wall construction records within 24 hours of completing each lift. Include the following in construction records:

- (1) Names of Soil Nail Wall Contractor, Superintendent, Nozzleman, Drill Rig Operator, Project Manager and Design Engineer;
- (2) Wall description, county, Department's contract, TIP and WBS element number;
- (3) Wall station and number and lift location, dimensions, elevations and description;
- (4) Nail locations, dimensions and inclinations, bar types, sizes and grades and temporary casing information;
- (5) Date and time drilling begins and ends, steel bars are inserted into drill holes, grout and shotcrete are mixed and arrives on-site and grout placement and shotcrete application begins and ends;
- (6) Grout volume, temperature, flow and density records;
- (7) Ground and surface water conditions and elevations if applicable;
- (8) Weather conditions including air temperature at time of grout placement and shotcrete application; and
- (9) All other pertinent details related to soil nail wall construction.

After completing each soil nail wall or stage of a wall, provide a PDF file of all corresponding construction records.

Nail Testing

"Proof tests" are performed on nails incorporated into walls, i.e., production nails. Define "test nail" as a nail tested with a proof test. Proof tests are typically required for at least one nail per nail row per soil nail wall or at least 5% of production nails, whichever is greater. More or less test nails may be required depending on subsurface conditions encountered. The Engineer will determine the number and locations of proof tests required. Do not test nails until grout and shotcrete attain the required 3 day compressive strength.

(A) Test Equipment

Use the following equipment to test nails:

- (1) Two dial gauges with rigid supports,
- (2) Hydraulic jack and pressure gauge and
- (3) Jacking block or reaction frame.

Provide dial gauges with enough range and precision to measure the maximum test nail movement to 0.001". Use pressure gauges graduated in 100 psi increments or less. Submit identification numbers and calibration records for load cells, jacks and pressure gauges with the soil nail wall design. Calibrate each jack and pressure gauge as a unit.

Align test equipment to uniformly and evenly load test nails. Use a jacking block or reaction frame that does not damage or contact shotcrete within 3 ft of nail heads. Place dial gauges opposite each other on either side of test nails and align gauges within 5° of bar inclinations. Set up test equipment so resetting or repositioning equipment during nail testing is not needed.

(B) Test Nails

Test nails include both unbonded and bond lengths. Grout only bond lengths before nail testing. Provide unbonded and bond lengths of at least 3 ft and 10 ft, respectively.

Steel bars for production nails may be overstressed under higher test nail loads. If necessary, use larger size or higher grade bars with more capacity for test nails instead of shortening bond lengths to less than the minimum required.

(C) Proof Tests

Determine maximum bond length (L_B) using the following:

$$L_B \leq (C_{RT} \times A_t \times f_y) / (Q_{ALL} \times 1.5)$$

Where,

- L_B = bond length (ft),
- C_{RT} = reduction coefficient, 0.9 for Grade 60 and 75 bars or 0.8 for Grade 150 bars,
- A_t = bar area (in²),
- f_y = bar yield stress (ksi) and
- Q_{ALL} = allowable unit grout/ground bond strength (kips/ft).

Determine design test load (DTL) based on as-built bond length and allowable unit grout/ground bond strength using the following:

$$DTL = L_B \times Q_{ALL}$$

Where,

- DTL = design test load (kips).

Perform proof tests by incrementally loading nails to failure or a load of 150% of DTL based on the following schedule:

Load	Hold Time
AL*	Until movement stabilizes
0.25 DTL	Until movement stabilizes
0.50 DTL	Until movement stabilizes
0.75 DTL	Until movement stabilizes
1.00 DTL	Until movement stabilizes
1.25 DTL	Until movement stabilizes
1.50 DTL	10 or 60 minutes (creep test)
AL*	1 minute

* Alignment load (AL) is the minimum load needed to align test equipment and should not exceed 0.05 DTL.

Reset dial gauges to zero after applying alignment load. Record test nail movement at

each load increment and monitor test nails for creep at the 1.5 DTL load increment. Measure and record movement during creep test at 1, 2, 3, 5, 6 and 10 minutes. If test nail movement between 1 and 10 minutes is greater than 0.04", maintain the 1.5 DTL load increment for an additional 50 minutes and record movement at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain load during hold times.

(D) Test Nail Acceptance

Submit 2 copies of test nail records including load versus movement and time versus creep movement plots within 24 hours of completing each proof test. The Engineer will review the test nail records to determine if test nails are acceptable. Test nail acceptance is based in part on the following criteria.

- (1) Total movement during creep test is less than 0.04" between the 1 and 10 minute readings or less than 0.08" between the 6 and 60 minute readings and creep rate is linear or decreasing throughout hold time.
- (2) Total movement at maximum load exceeds 80% of the theoretical elastic elongation of the unbonded length.
- (3) Pullout failure does not occur at or before the 1.5 DTL load increment. Define "pullout failure" as the inability to increase load while movement continues. Record pullout failure load as part of test nail data.

Maintain stability of unbonded lengths for subsequent grouting. If a test nail is accepted but the unbonded length cannot be satisfactorily grouted, do not incorporate the test nail into the soil nail wall and add another production nail to replace the test nail.

If the Engineer determines a test nail is unacceptable, either perform additional proof tests on adjacent production nails or revise the soil nail design or installation methods for the production nails represented by the unacceptable test nail as determined by the Engineer. Submit a revised soil nail wall design for acceptance, provide an acceptable test nail with the revised design or installation methods and install additional production nails for the nails represented by the unacceptable test nail.

After completing nail testing for each soil nail wall or stage of a wall, provide a PDF file of all corresponding test nail records.

Measurement and Payment

Temporary soil nail walls will be measured and paid in square feet. Temporary soil nail walls will be paid for at the contract unit price for *Temporary Shoring*. Temporary soil nail walls will be measured as the square feet of exposed wall face area. No measurement will be made for any embedment or pavement thickness above soil nail walls.

The contract unit price for *Temporary Shoring* will be full compensation for providing soil nail wall designs, submittals, labor, tools, equipment and soil nail wall materials, excavating, hauling and removing excavated materials, installing and testing soil nails, grouting, shotcreting and supplying drain strips and any incidentals necessary to construct soil nail walls. No additional payment will be made and no extension of completion date or time will be allowed for repairing property damage, overexcavations or unstable excavations, unacceptable test nails or thicker shotcrete.

No payment will be made for temporary shoring not shown in the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. No value engineering proposals will be accepted based solely on revising or eliminating shoring locations shown in the plans or estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions.

PCB will be measured and paid in accordance with Section 1170 of the *Standard Specifications*. No additional payment will be made for anchoring PCB for soil nail walls. Costs for anchoring PCB will be incidental to soil nail walls.

Temporary guardrail will be measured and paid for in accordance with Section 862 of the *Standard Specifications*.



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10/22/2018

STANDARD SHORING:**(1-16-18)****Description**

Standard shoring includes standard temporary shoring and standard temporary mechanically stabilized earth (MSE) walls. At the Contractor's option, use standard shoring as noted in the plans or as directed. When using standard shoring, a temporary shoring design submittal is not required. Construct standard shoring based on actual elevations and shoring dimensions in accordance with the contract and Geotechnical Standard Detail No. 1801.01 or 1801.02.

Define "standard temporary shoring" as cantilever shoring that meets the standard temporary shoring detail (Geotechnical Standard Detail No. 1801.01). Define "standard temporary wall" as a temporary MSE wall with geotextile or geogrid reinforcement that meets the standard temporary wall detail (Geotechnical Standard Detail No. 1801.02). Define "standard temporary geotextile wall" as a standard temporary wall with geotextile reinforcement and "standard temporary geogrid wall" as a standard temporary wall with geogrid reinforcement.

Provide positive protection for standard shoring at locations shown in the plans and as directed. See *Temporary Shoring* provision for positive protection types and definitions.

Materials

Refer to the *Standard Specifications*.

Item	Section
Concrete Barrier Materials	1170-2
Flowable Fill, Excavatable	1000-6
Geosynthetics	1056
Neat Cement Grout, Type 1	1003
Portland Cement Concrete, Class A	1000
Select Materials	1016
Steel Beam Guardrail Materials	862-2
Steel Sheet Piles and H-Piles	1084
Untreated Timber	1082-2
Welded Wire Reinforcement	1070-3

Provide Type 6 material certifications for shoring materials. Use Class IV select material for temporary guardrail. Use Class A concrete that meets Article 450-2 of the *Standard Specifications* or grout for drilled-in piles.

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, use sheet piles with the minimum required section modulus or H-piles with the sizes shown in Geotechnical Standard Detail No. 1801.01. Use untreated timber with a thickness of at least 3" and a bending stress of at least 1,000 psi for timber lagging.

(A) Shoring Backfill

Use Class II, Type 1, Class III, Class V or Class VI select material or material that meets AASHTO M 145 for soil classification A-2-4 with a maximum PI of 6 for shoring backfill except do not use the following:

- (1) A-2-4 soil for backfill around culverts,

- (2) A-2-4 soil in the reinforced zone of standard temporary walls with a back slope and
- (3) Class VI select material in the reinforced zone of standard temporary geotextile walls.

(B) Standard Temporary Walls

Use welded wire reinforcement for welded wire facing, struts and wires with the dimensions and minimum wire sizes shown in Geotechnical Standard Detail No. 1801.02. Provide Type 2 geotextile for separation and retention geotextiles. Do not use more than 4 different reinforcement strengths for each standard temporary wall.

(1) Geotextile Reinforcement

Provide Type 5 geotextile for geotextile reinforcement with a mass per unit area of at least 8 oz/sy in accordance with ASTM D5261. Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geotextile wall location, provide geotextiles with ultimate tensile strengths as shown in Geotechnical Standard Detail No. 1801.02.

(2) Geogrid Reinforcement

Use geogrids with a roll width of at least 4 ft and an “approved” or “approved for provisional use” status code. The list of approved geogrids is available from: connect.ncdot.gov/resources/Materials/Pages/Materials-Manual-by-Material.aspx

Based on actual wall height, groundwater elevation, slope or surcharge case and shoring backfill to be used in the reinforced zone at each standard temporary geogrid wall location, provide geogrids for geogrid reinforcement with short-term design strengths as shown in Geotechnical Standard Detail No. 1801.02. Geogrids are typically approved for ultimate tensile strengths in the machine direction (MD) and cross-machine direction (CD) or short-term design strengths for a 3-year design life in the MD based on material type. Define material type from the website above for shoring backfill as follows:

Material Type	Shoring Backfill
Borrow	A-2-4 Soil
Fine Aggregate	Class II, Type 1 or Class III Select Material
Coarse Aggregate	Class V or VI Select Material

If the website does not list a short-term design strength for an approved geogrid, use a short-term design strength equal to the ultimate tensile strength divided by 3.5 for the geogrid reinforcement.

Preconstruction Requirements

(A) Concrete Barrier

Define “clear distance” behind concrete barrier as the horizontal distance between the barrier and edge of pavement. The minimum required clear distance for concrete barrier is shown in the plans. At the Contractor’s option or if the minimum required clear

distance is not available, set concrete barrier next to and up against traffic side of standard shoring except for barrier above standard temporary walls. Concrete barrier with the minimum required clear distance is required above standard temporary walls.

(B) Temporary Guardrail

Define “clear distance” behind temporary guardrail as the horizontal distance between guardrail posts and standard shoring. At the Contractor’s option or if clear distance for standard temporary shoring is less than 4 ft, attach guardrail to traffic side of shoring as shown in the plans. Place ABC in clear distance and around guardrail posts instead of pavement. Do not use temporary guardrail above standard temporary walls.

(C) Standard Shoring Selection Forms

Before beginning standard shoring construction, survey existing ground elevations in the vicinity of standard shoring locations to determine actual shoring or wall heights (H). Submit a standard shoring selection form for each location at least 7 days before starting standard shoring construction. Standard shoring selection forms are available from:

connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx

Construction Methods

Construct standard shoring in accordance with the *Temporary Shoring* provision.

(A) Standard Temporary Shoring Installation

Based on actual shoring height, positive protection, groundwater elevation, slope or surcharge case and traffic impact at each standard temporary shoring location, install piles with the minimum required embedment and extension for each shoring section in accordance with Geotechnical Standard Detail No. 1801.01. For concrete barrier above and next to standard temporary shoring and temporary guardrail above and attached to standard temporary shoring, use “surcharge case with traffic impact” in accordance with Geotechnical Standard Detail No. 1801.01. Otherwise, use “slope or surcharge case with no traffic impact” in accordance with Geotechnical Standard Detail No. 1801.01. If refusal is reached before driven piles attain the minimum required embedment, use drilled-in H-piles with timber lagging for standard temporary shoring.

(B) Standard Temporary Walls Installation

Based on actual wall height, groundwater elevation, slope or surcharge case, geotextile or geogrid reinforcement and shoring backfill in the reinforced zone at each standard temporary wall location, construct walls with the minimum required reinforcement length and number of reinforcement layers for each wall section in accordance with Geotechnical Standard Detail No. 1801.02. For standard temporary walls with pile foundations in the reinforced zone, drive piles through reinforcement after constructing temporary walls.

For standard temporary walls with interior angles less than 90°, wrap geosynthetics at acute corners as directed by the Engineer. Place geosynthetics as shown in Geotechnical Standard Detail No. 1801.02. Place separation geotextiles between shoring backfill and backfill, natural ground or culverts along the sides of the reinforced zone perpendicular to the wall face. For Class V or VI select material in the reinforced zone, place separation geotextiles between shoring backfill and backfill or natural ground on top of and at the

back of the reinforced zone.

Measurement and Payment

Standard shoring will be measured and paid in accordance with the *Temporary Shoring* provision.



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Scott A. Hidden
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10/22/2018

GEOTEXTILE FOR PAVEMENT STABILIZATION:**(5-15-18)****Description**

Supply and install geotextile for pavement stabilization in accordance with the contract. Geotextile for pavement stabilization may be required above chemically stabilized subgrades or below Class IV subgrade stabilization to prevent pavement cracking at locations shown in the plans and as directed. Define “subbase” as the portion of the roadbed below the Class IV subgrade stabilization.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Geotextiles	1056
Select Material, Class IV	1016

Use Class IV select material for Class IV subgrade stabilization. Provide Type 5 geotextile for geotextile for pavement stabilization that meets the following tensile strength requirements in the machine direction (MD) and cross-machine direction (CD):

GEOTEXTILE FOR PAVEMENT STABILIZATION REQUIREMENTS		
Tensile Strength	Requirement (MARV^A)	Test Method
Tensile Strength @ 5% Strain (MD & CD ^A)	1,900 lb/ft	ASTM D4595
Ultimate Tensile Strength (MD & CD ^A)	4,800 lb/ft	ASTM D4595

A. MD, CD and MARV per Article 1056-3 of the *Standard Specifications*.

Construction Methods

Geotextile for pavement stabilization may be required at locations shown in the plans and other locations as directed. For locations with ABC on chemically stabilized subgrades, use of geotextile for pavement stabilization will be based on sampling and testing for chemical stabilization. For all other locations, notify the Engineer when the embankment is completed to within 2 ft of subgrade elevation and allow 3 days for the Engineer to determine if geotextile for pavement stabilization is required.

Before placing geotextile for pavement stabilization below Class IV subgrade stabilization, proof roll subbases in accordance with Section 260 of the *Standard Specifications*. Place geotextile for pavement stabilization above chemically stabilized subgrades or below Class IV subgrade stabilization as shown in the plans. Pull geotextiles taut so they are in tension and free of kinks, folds, wrinkles or creases. Install geotextile for pavement stabilization perpendicular to the survey or lane line in the MD and adjacent to each other in the CD as shown in the plans. Continuous geotextiles are required in the MD, i.e., do not splice or overlap geotextiles so seams are parallel to the survey or lane line. Completely cover stabilized subgrades or subbases with geotextile for pavement stabilization. Overlapping geotextiles in the CD is permitted but not required. Overlap geotextiles in the direction that aggregate will be placed to prevent lifting the edge of the top geotextile. Hold geotextiles in place with wire staples or anchor pins as needed.

Do not damage geotextile for pavement stabilization when placing ABC or Class IV subgrade stabilization. Place and compact ABC in accordance with the contract and *Standard*

Specifications. Place, compact and maintain Class IV subgrade stabilization in accordance with Article 505-3 of the *Standard Specifications* for a Type 2 aggregate subgrade. Do not operate heavy equipment on geotextiles any more than necessary to construct base courses or subgrades. Replace any damaged geotextiles to the satisfaction of the Engineer.

Measurement and Payment

Geotextile for Pavement Stabilization will be measured and paid in square yards. Geotextiles will be measured along subgrades or subbases as the square yards of exposed geotextiles installed before placing ABC or Class IV subgrade stabilization. No measurement will be made for overlapping geotextiles. The contract unit price for *Geotextile for Pavement Stabilization* will be full compensation for providing, transporting and installing geotextiles, wire staples and anchor pins.

Class IV Subgrade Stabilization will be measured and paid in accordance with Article 505-4 of the *Standard Specifications*. No measurement will be made for any undercut excavation of fill materials from subbases.

Payment will be made under:

Pay Item

Geotextile for Pavement Stabilization

Pay Unit

Square Yard



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1/23/2019

**PROJECT SPECIAL PROVISIONS
GEOENVIRONMENTAL**

CONTAMINATED SOIL (5/23/2018)

The Contractor's attention is directed to the fact that soil contaminated with petroleum hydrocarbon compounds exist within the project area. The known areas of contamination are indicated on corresponding plans sheets. Information relating to these contaminated areas, sample locations, and investigation reports will be available at the following web address by navigating to the correct letting year and month then selecting, "Plans and Proposals", "R-2530B", "GeoEnv Postings":

<http://dotw-xfer01.dot.state.nc.us/dsplan/>

Petroleum contaminated soil may be encountered during any earthwork activities on the project. The Contractor shall only excavate those soils that the Engineer designates necessary to complete a particular task. The Engineer shall determine if soil is contaminated based on petroleum odors and unusual soil staining. Contaminated soil not required to be excavated is to remain in place and undisturbed. Undisturbed soil shall remain in place, whether contaminated or not. The Contractor shall transport all contaminated soil excavated from the project to a facility licensed to accept contaminated soil.

The stockpile shall be created within the property boundaries of the source material and in accordance with the Diagram for Temporary Containment and Treatment of Petroleum-Contaminated Soil per North Carolina Department of Environmental Quality's Division of Waste Management UST Section GUIDELINES FOR EX SITU PETROLEUM CONTAMINATED SOIL REMEDIATION. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDEQ UST Section's Regional Office for off-site temporary storage. Stockpiling contaminated soil will be incidental to the project. The Contractor shall provide disposal manifests and weigh tickets to the Engineer for review and approval. The Engineer will in turn provide the GeoEnvironmental Section with a copy of the disposal manifests and weigh tickets for their records.

Measurement and Payment:

The quantity of contaminated soil hauled, and disposed of shall be the actual number of tons of material, which has been acceptably transported and weighed with certified scales as documented by disposal manifests and weigh tickets. The quantity of contaminated soil, measured as provided above, shall be paid for at the contract unit price per ton for "Hauling and Disposal of Petroleum Contaminated Soil".

The above price and payment shall be full compensation for all work covered by this section, including, but not limited to loading, transportation, weighing, laboratory testing, disposal, equipment, decontamination of equipment, labor, and personal protective equipment.

Payment shall be made under:

Pay Item

Hauling and Disposal of Petroleum Contaminated Soil

Pay Unit
Ton

DocuSigned by:

Cyrus Parker

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7/25/2019



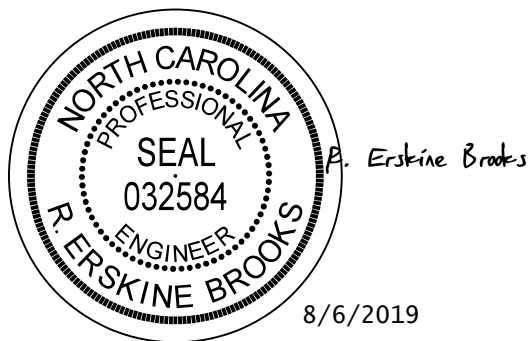
TC-1

Project: R2530B

County: Stanly/Montgomery

WORK ZONE TRAFFIC CONTROL Project Special Provisions Table of Contents

Special Provision	Page
Traffic Control Devices from Previous Project	TC-2



TC-2

Project: R2530B

County: Stanly/Montgomery

TRAFFIC CONTROL DEVICES REMAINING FROM PREVIOUS PROJECT:

(02/06/2013)

Description

Accept ownership, monitor, maintain, replace, and remove the following traffic control devices, which are remaining from **B-4974 and 15BPR.43 (as shown on TMP-12 & 13)** in accordance with the plans and specifications.

- 1- ***STATIONARY SIGNS – 152 SF***
- 2- ***TYPE III BARRICADES – 96 LF***
- 3- ***BARRICADE MOUNTED SIGNS – 102 SF***
- 4- ***DRUMS – 100 EA***
- 5- ***CHANGEABLE MESSAGE SIGNS – 1 EA***
- 6- ***PORTABLE CONCRETE BARRIER – 510 LF***
- 7- ***TEMPORARY CRASH CUSHION – 2 EA***

Materials

Replace any of the above mentioned devices which do not meet the material requirements of their respective specifications as directed by the Engineer.

Construction Methods

Accept ownership and maintenance responsibilities of the above mentioned devices and retain ownership at the completion of the project.

Section 1105-3 of the 2018 Standard Specifications applies to this special provision.

Maintenance

Maintain the above mentioned devices in accordance with Section 1105-4 of the 2018 Standard Specifications.

Basis of Payment

No separate payment will be made for the maintenance, replacement, and removal of the above mentioned devices. Such work will be considered as incidental to the other traffic control items listed in the contract.

Project: R2530B

UC-1

County: Stanly/Montgomery

PROJECT SPECIAL PROVISIONS

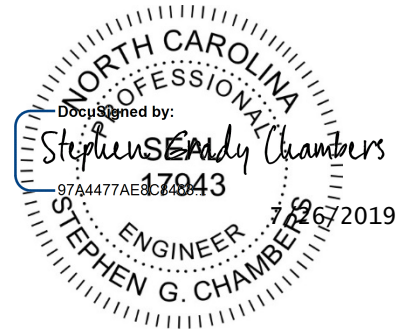
Utility Construction



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Stephen G. Chambers, PE | Project Engineer



(seal)

Revise the 2018 Standard Specifications as follows:

Page 15-1 Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:

add the following sentences:

The utility owner is City of Albemarle. The contact person is Michael Ferris and he can be reached by phone at 704-984-9410.

WATER LINES

All water pipe 4" to 12" shall be Ductile Iron Pressure Class 350.

WATER FITTINGS

All fittings shall be ductile iron restrained joint.

WATER SERVICES

All water services shall be Type K copper pipe.

Project: R-2530B

UC-2

County: Stanly/Montgomery

All services less than 100' in length shall be ¾" lines. All services greater than 100' in length shall be 1" lines; if service is currently greater than these conditions, contractor shall match the existing service line size.

All service taps shall be direct tap, no tapping saddle required.

WATER METERS

Water meter size not surveyed; contractor shall replace water meters to match their existing size.

All water meters shall measure usage in 'cubic feet'.

Water meters sized ¾" through 1-1/2" shall be 'Master Meter' brand. Water meters sized 2" and above shall be 'Octave' type meter by 'Master Meter' brand.

All water meters will be radio read; contractor shall provide a connector and '100W ERT communication module' by 'Itron' brand.

Contractor shall furnish all ¾" to 1-1/2" meters to owner for final installation by city, coordinate with City of Albemarle contact provided.

FIRE HYDRANTS

All fire hydrants shall be 'Super Centurion' type hydrant by 'Mueller' brand. Hydrants shall open right with a 4-1/2" main valve opening.

SEWER LINES

All sewer pipe shall be ASTM D3034 PVC or sewer rated ductile iron pipe, as shown on plans. All sewer pipe with less than 10' of cover shall be rated SDR 35. All sewer pipe with more than 10' of cover shall be rated SDR 26, as shown on profiles.

UTILITY VAULT

See plans and details for all specifications for PRV vaults and master meter. All other utility vaults shall be relocated or replaced as necessary to match their existing conditions.

Utility vault on Highway 24/27 at parcel number 11, sheet UC-05, -L- Sta. +/-32+82:

Replace in kind existing utility vault. Utility vault is a 9'x7' vault with 4.5'x4.5' aluminum hatch opening. Vault contents include 6" Watts double check valve backflow detector assembly with factory valves. Piping includes 6"x4" tee with 4" fire department hookup. Backflow device includes tamper switches; relocate existing switches to new vault.

Utility vault on Highway 24/27 at parcel number 18, sheet UC-05, -L- Sta. +/-37+24:

Replace in kind existing utility vault. Utility vault is a 9'x7' vault with 5.5'x5.5' aluminum hatch opening. Vault contents include 6" Wilkin double check valve backflow detector assembly with factory valves. Piping includes a 6" bypass with 6" gate valve.

Project: R-2530B

UC-3

County: Stanly/Montgomery

Utility vault at on Highway 740 at parcel number 216, sheet UC-27, -Y1- Sta. +/-11+30:

Replace in kind existing utility vault. Utility vault is a 10’x7’ concrete meter vault with a 12” Hershey RPZ with factory valves. Piping includes 12”x 4” tee w/ 4” piping reduced 2” fire connection through top of vault. Piping also includes 1” water service line parallel to 12” line with 1” meter.

Measurement and Payment:

Payment for utility vaults shall be per each, and paid for under the contract price ‘Utility Vault’. Such price and payments will be full compensation for all labor, materials, excavation, backfilling and associated appurtenances necessary to complete work as specified in plans and specifications.

Pay Item	Pay Unit
Utility Vault	EA

PUMP STATION

See plan sheets, detail sheets, and attached specifications manual for all pump station construction specifications.

Measurement and Payment:

Payment for sanitary sewer pump station shall be lump sum, and paid for under the contract price ‘Sanitary Sewer Pump Station’. Such price and payments will be full compensation for all labor, materials, excavation, backfilling and associated appurtenances necessary to complete work as specified in plans and specifications.

Pay Item	Pay Unit
Sanitary Sewer Pump Station	LS

FORCE MAIN SEWER LINES

All 12” force main sewer pipe shall be sewer rated ductile iron pipe.

All 4” force main sewer pipe shall be AWWA C900 PVC DR 18.

SEWER LATERALS

All sewer laterals shown on plan sheets were field located by visual means by the engineer; therefore, not all laterals may be shown. Contractor shall field verify location of all sewer laterals and replace to match the existing size.

SEWER FITTINGS

All fittings shall be ductile iron restrained joint.

Project: R2530B

UC-4

County: Stanly/Montgomery

PROJECT SPECIAL PROVISIONS

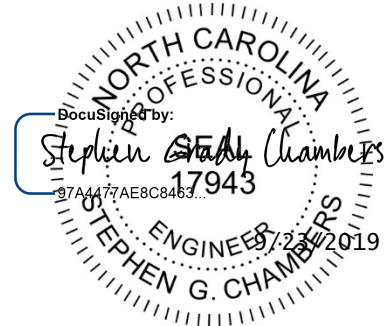
Utility Construction



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Stephen G. Chambers, PE | Project Engineer



(seal)

Revise the 2018 Standard Specifications as follows:

Page 15-1 Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:

add the following sentences:

The utility owner is Stanly County. The contact person is Duane Wingo and he can be reached by phone at 704-986-3686.

WATER LINES

All water pipe 4" to 12" shall be AWWA C900 DR18 or DIP PC 350, as shown on plans.

WATER FITTINGS

All fittings shall be ductile iron restrained joint.

Project: R-2530B

UC-5

County: Stanly/Montgomery

WATER SERVICES

All water services shall be SDR 9 CTS POLY.

All services shall be 1 1/2" lines with SCH40 PVC sleeves on the long side.

WATER METERS

All water meters shall conform to the detail provided showing a meter box and PRV valve box.

Water meter size not surveyed; contractor shall replace water meters to match their existing size.

All water meters shall measure usage in 'gallons'.

All water meters shall be 'T10 Neptune R900I' with a 10-digit ERT number.

FIRE HYDRANTS

All fire hydrants shall be 'Super Centurion' type hydrant by 'Mueller' brand (or approved equal by 'Waterous' or 'WaterMaster' brand). Hydrants shall open left with a 5-1/4" main valve opening with storz cap on main opening.

UTILITY VAULT

See plans and details for all specifications on PRV vaults and master meter. All other utility vaults shall be relocated or replaced as necessary to match their existing conditions.

Pressure reducing station 1:

Located on Highway 24/27 at parcel number 143. See sheet UC-03F for all specifications.

Pressure reducing station 2:

Located on Indian Mound Road at parcel number 144. See sheet UC-03F for all specifications

Master Meter:

Located on Highway 24/27 at parcel number 75. See sheet UC-03F for all specifications.

Measurement and Payment:

Payment for utility vaults shall be per each, and paid for under the contract price 'Utility Vault'. Such price and payments will be full compensation for all labor, materials, excavation, backfilling and associated appurtenances necessary to complete work as specified in plans and specifications.

Pay Item

Utility Vault

Pay Unit

EA



The City of Albemarle

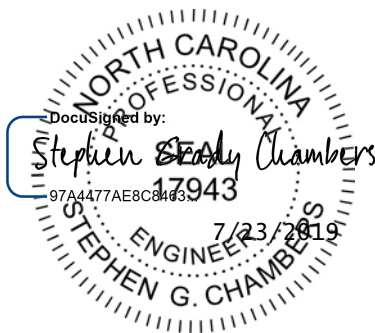
North Carolina

R2530B

Pump Station Specifications Project Manual

December 2018

CEPA Project No: 2018-1137



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UC-7

1

2

**SECTION 08305
ACCESS DOORS**

3

PART 1 - GENERAL**1.1 SUMMARY**

6 A. Section Includes:

7 1. All access doors.

8 B. Related Sections include but are not necessarily limited to:

9 1. Division 1 - General Requirements.

1.2 QUALITY ASSURANCE

11 A. Referenced Standards:

12 1. Underwriters Laboratories, Inc. (UL):

13 a. Building Products Directory.

1.3 DEFINITIONS

15 A. Standard Duty: Will support live load of 150 psf.

1.4 SUBMITTALS

17 A. Shop Drawings:

18 1. See Section 01340.

19 2. Product technical data including:

20 a. Acknowledgement that products submitted meet requirements of standards referenced.

21 b. Manufacturer's installation instructions.

22 B. Operation and Maintenance Manuals:

23 1. See Section 01340.

PART 2 - PRODUCTS**2.1 ACCEPTABLE MANUFACTURERS**26 A. Subject to compliance with the Contract Documents, the following manufacturers are
27 acceptable:

28 1. Standard duty doors:

29 a. Bilco Company.

30 b. Or equal.

2.2 MANUFACTURED UNITS

32 A. Access Doors:

33 1. Frame: ¼ IN mill finished aluminum.

34 2. Bituminous coated when in contact with concrete.

35 3. Cover: ¼ IN mill finished diamond plate aluminum.

36 4. All Hardware: Stainless steel.

37 5. Grip Handle: Vinyl.

38 6. Fabricate frame with built-in neoprene cushion and strap anchors bolted to exterior.

39 7. Reinforce cover with aluminum stiffeners.

40 8. Bolt hinges to underside of door. Pivot on torsion bars.

41 9. Fabricate doors to open to 90 degrees and automatically lock into open position.

6 **END OF SECTION**

1

2

SECTION 09905

3

PAINTING AND PROTECTIVE COATINGS

4

PART 1 - GENERAL

5

1.1 SUMMARY

6

A. Section Includes:

7

1. Painting and protective coatings.

8

2. Minimum surface preparation requirements.

9

B. Related Sections include but are not necessarily limited to:

10

1. Division 1 - General Requirements.

11

2. Section 03002 – Concrete.

12

3. Section 11005 - Equipment: Basic Requirements.

13

4. Section 16010 – Electrical: Basic Requirements.

14

1.2 QUALITY ASSURANCE

15

A. Referenced Standards:

16

1. American National Standards Institute (ANSI):

17

a. Z535.1, Safety Color Code.

18

2. American Society for Testing and Materials (ASTM):

19

a. A780, Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

20

b. E84, Test Method for Surface Burning Characteristics of Building Materials.

21

3. National Bureau of Standards (NBS):

22

a. Certified Coating Thickness Calibration Standards.

23

4. National Fire Protection Association (NFPA):

24

a. 101, Life Safety Code.

25

5. Steel Structures Painting Council (SSPC):

26

a. PA-2, Measurement of Dry Paint Thickness with Magnetic Gages.

27

b. SP-1, Solvent Cleaning.

28

c. SP-2, Hand Tool Cleaning.

29

d. SP-3, Power Tool Cleaning.

30

e. SP-6, Commercial Blast Cleaning.

31

f. SP-10, Near-White Blast Cleaning.

32

B. Qualifications:

33

1. Coating manufacturer's authorized representative shall provide written statement attesting that Applicator has been instructed on proper preparation, mixing and application procedures for coatings specified.

34

2. Contractor and applicators shall have minimum of 10 years experience in application of similar products on similar project. Provide references for minimum of three different projects completed in last 5 years with similar scope of work. Include name and address of project, size of project in value (painting) and contact person.

35

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C. Miscellaneous:

42

1. Furnish paint through one manufacturer unless noted otherwise.

43

D. Deviation from specified mil thickness or product type is not allowed without written authorization of Engineer.

44

45

E. Material may not be thinned unless approved, in writing, by paint manufacturer's authorized representative.

46

1.3 DEFINITIONS

- A. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 1. Installer or applicator are synonymous.
- B. Approved Factory Finish: Finish on a product in compliance with the finish specified in the section where the product is specified or in Section 11005.
- C. Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to frequent condensation, spillage or splash of a corrosive material such as water, wastewater, or chemical solution; or chronic exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range of 5 - 9.
- D. Highly Corrosive Environment: Immersion in, or not more than 6 IN above, or subject to frequent condensation, spillage or splash of a corrosive material such as water, wastewater, or chemical solution; or chronic exposure to corrosive, caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions with pH range below 5 or above 9.
- E. Exposed Exterior Surface: Surface which is exposed to weather but not necessarily exposed to view as well as surface exposed to view.
- F. Paint includes fillers, primers, sealers, emulsions, oils, alkyds, latex, enamels, thinners, stains, epoxies, vinyls, chlorinated rubbers, urethanes, shellacs, varnishes, and any other applied coating specified within this Section.
- G. VOC: Volatile Organic Compounds.
- H. Water level for purposes of painting is: See Drawings.

1.4 SUBMITTALS

- A. Manufacturer's statement regarding Applicator instruction on product use.
- B. Contractor and applicator experience qualifications.
- C. Manufacturer's recommendation for universal barrier coat.
- D. Shop Drawings:
 - 1. See Section 01340.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's application instructions.
 - c. Manufacturer's surface preparation instructions.
 - d. If products being used are manufactured by Company other than listed in Article 2.2, provide complete individual data sheet comparison of proposed products with specified products including application procedure, coverage rates and verification that product is designed for intended use.
 - e. Contractor's written plan of action for containing airborne particles created by blasting operation and location of disposal of spent contaminated blasting media.
 - f. Coating manufacturer's recommendation on abrasive blasting.
- E. Samples:
 - 1. Manufacturer's full line of colors for Engineer's color selection.
 - 2. After initial color selection by Engineer provide two 3 x 5 IN samples of each color selected.
- F. Miscellaneous Submittals:
 - 1. See Section 01340.
 - 2. Approval of application equipment.
 - 3. Applicator's daily record when requested by Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING

- 1 A. Deliver in original containers, labeled as follows:
- 2 1. Name or type number of material.
- 3 2. Manufacturer's name and item stock number.
- 4 3. Contents, by volume, of major constituents.
- 5 4. Warning labels.
- 6 5. VOC content.

7 **PART 2 - PRODUCTS**

8 **2.1 ACCEPTABLE MANUFACTURERS**

- 9 A. Subject to compliance with the Contract Documents, only the following manufacturers are
- 10 acceptable:
- 11 1. Tnemec.
- 12 2. Ameron Protective Coatings Div.
- 13 3. ICI Devoe.
- 14 4. Valspar Corp.
- 15 5. Carboline Protective Coatings.
- 16 6. Sherwin Williams.
- 17 7. Dampney Company, Inc.
- 18 B. Submit requests for substitution in accordance with Specification Section 01640.

19 **2.2 MATERIALS**

- 20 A. All materials used must contain not more than 2.8 LBS/GAL VOC.
- 21 B. For unspecified materials such as thinner, provide manufacturer's recommended products.
- 22 C. Paint Systems - General:
- 23 1. P=prime coat. F1, F2 . . . Fn = first finish coat,
- 24 second finish coat nth finish coat, color as selected by Engineer.
- 25 2. If two finish coats of same material are required, Contractor may, at his option and by written
- 26 approval from paint manufacturer, apply one coat equal to mil thickness of two coats
- 27 specified.
- 28 D. Products specified are manufactured by Tnemec.
- 29 E. Paint Systems:
- 30 1. System #2 - Polyamidoamine Epoxy with Polyamidoamine Epoxy Top Coat.
- 31 P1-Series N69 Epoxoline Primer VOC=2.11
- 32 (Polyamidoamine Epoxy)
- 33 1 coat, 5 mils
- 34 *F1=Series N69 Epoxoline VOC=2.11
- 35 (Polyamidoamine Epoxy)
- 36 1 coat, 5 mils
- 37 *F2 Series 1074 Endura-Shield (Aliphatic Acrylic VOC=1.81
- 38 Polyurethane Enamel)
- 39 1 coat, 2.5 mils
- 40 *Add F2 for exposed surfaces of exterior environment
- 41
- 42 2. System #3 - {NOT USED.} Polyamidoamine Epoxy Primer with Polyamidoamine Epoxy or
- 43 Aliphatic Acrylic Polyurethane Enamel Top Coats.
- 44
- 45 P1-Series N69 Epoxoline Primer VOC=2.11
- 46 (Polyamidoamine Epoxy)
- 47 1 coat, 2 mils
- 48 *F1=Series N69 Epoxoline

UC-12

- 1 (Polyamidoamine Epoxy)
2 1 coat, 2 mils
3 *F1E=Series 1074 Endura-Shield (Aliphatic Acrylic VOC=2.80
4 01 coat, 2.5 mils
5 *Replace F1 with F1E for exterior environment
6
7 3. System #5 - Polyamide Epoxy Primer with Polyamidoamine Epoxy or Aliphatic Acrylic
8 Polyurethane Enamel Top Coats.
9
10 P1=Series N27 F.C. Typoxy (Polyamide Enamel) VOC=2.49
11 1 coat, 2.0 mils
12 *F1=Series N69 Epoxoline VOC=2.11
13 (Polyamidoamine Epoxy)
14 1 coat, 2.5 mils
15 *F1E=Series 1074 Endura-Shield (Aliphatic Acrylic VOC=1.81
16 Polyurethane Enamel)
17 1 coat, 2.0 mils
18 *Replace F1 with F1E for exterior environment.
19
20
21 4. System #11 - Zinc-Rich Aromatic Urethane Primer.
22
23 P1=90-97 Tneme-Zinc (Zinc-Rich Urethane) VOC=2.67
24 1 coat, 3.0 mils
25
26 5. System #19 - Polyamidoamine Epoxy Coating.
27
28 P1=Series N69 Epoxoline VOC=2.11
29 (Polyamidoamine Epoxy)
30 1 coat, 5 mils
31
32 6. System #25 - {NOT USED.} Zinc-Rich Urethane Primer.
33

34 PART 3 - EXECUTION**35 3.1 ITEMS TO BE PAINTED**

- 36 A. Exterior Surfaces including:
37 1. Piping, valves, fittings, and hydrants and supports.
38 2. Conduit, device boxes, junction boxes and covers, pull boxes and covers and supports
39 3. Miscellaneous ferrous metal surfaces.
40 4. Structural steel.
41 5. Galvanized metal surfaces.
42 6. Copper and brass surfaces.
43 B. Surfaces in Areas Not Considered Finished:
44 1. Paint following surfaces in areas not considered as finished area:
45 a. Piping, valves, fittings, and hydrants and supports.
46 b. Structural and miscellaneous steel.
47 c. Miscellaneous ferrous metal surfaces.
48 C. New Equipment except:
49 1. Where noted in Article 3.2.
50 2. Where specified elsewhere in the Contract Documents.

51 3.2 ITEMS NOT TO BE PAINTED

UC-13

- 1 A. General: Do not paint items listed in Article 3.2 unless specifically noted in the Contract
2 Documents to be painted.
- 3 B. Electrical Equipment:
4 1. Do not field paint certain items of electrical equipment as listed in Section 11005 or 16010
5 except where painting is specifically stated elsewhere in these Contract Documents, or where
6 the equipment is subject to a corrosive environment.
- 7 C. Other Items:
8 1. Stainless steel surfaces except:
9 a. Piping.
10 b. Banding as required to identify piping.
11 2. Aluminum surfaces except:
12 a. Where specifically shown in the Contract Documents.
13 b. Where in contact with concrete.
14 c. Where in contact with dissimilar metals.
15 3. Fiberglass surfaces except:
16 a. Fiberglass piping.
17 b. Piping supports.
18 4. Interior of pipe, ductwork, and conduits.
19 5. Moving parts of mechanical and electrical units where painting would interfere with the
20 operation of the unit.
21 6. Code labels and equipment identification and rating plates.

3.3 SCHEDULE OF ITEMS TO BE PAINTED AND PAINTING SYSTEMS

	PAINTING SYSTEM NUMBER
26 A. Structural and Miscellaneous Steel:	
27 1. Non-immersion surfaces subject to corrosive or highly	2
28 corrosive environment.	
29 B. Ferrous metals subject to corrosive environment including ferrous metal	2
30 components, piping, pumps, and similar items.	
31 C. Galvanized Metals:	
32 1. Assembled galvanized steel items.	3
33 2. Electrical conduit.	3
34 3. Field touch-up of galvanized surfaces not requiring a finish	11
35 top coat.	
36 a. Paint only damaged areas.	
37 D. Steel equipment with existing paint coating or factory-applied prime	5
38 or finish coating including:	
39 1. Equipment specifically indicated in the Contract Documents	
40 to be painted. Factory-applied coats to remain.	
41 E. Non-ferrous metals (except galvanized): Including copper, bronze, brass,	3
42 and aluminum specifically indicated on the Drawings	
43 to be painted.	
44 F. Plastic Surfaces:	
45 1. PVC, FRP, and CPVC surfaces including tankage and conduit.	3
46 G. Aluminum in contact with concrete and between dissimilar metals which	19
47 are above liquid level.	

3.4 PREPARATION

- 49 A. General:

UC-14

1. Prepare surfaces to be painted in accordance with coating manufacturer's instructions and this Section unless noted otherwise in the Specification.
 2. Remove all dust, grease, oil, compounds, dirt and other foreign matter which would prevent bonding of coating to surface.
- B. Protection:
1. Protect surrounding surfaces not to be coated.
 2. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.
- C. Prepare and Paint Before Assembly: Where component is subject to corrosive or highly corrosive environment, prepare and paint, before assembly, all surfaces which may be subject to environment which are inaccessible after assembly.
- D. Ferrous Metal:
1. Prepare ductile iron pipe in accordance with pipe manufacturer's recommendations and AWWA.
 2. Complete fabrication, welding or burning before beginning surface preparation.
 - a. Chip or grind off flux, spatter, slag or other laminations left from welding.
 - b. Remove mill scale.
 - c. Grind smooth rough welds and other sharp projections.
 3. Solvent clean in accordance with SSPC SP-1 all surfaces scheduled to receive additional SSPC surface preparation.
 4. Surfaces subject to corrosive or highly corrosive environment and all surfaces subject to immersion service:
 - a. Near-white blast clean in accordance with SSPC SP-10.
- E. Galvanized Metal:
1. Solvent clean in accordance with SSPC SP-1 followed by abrasive brush blast in accordance with SSPC SP-7 to provide 1 mil profile.
- F. Preparation by Abrasive Blasting:
1. All abrasive-blasted ferrous metal surfaces shall be inspected immediately prior to application of paint coatings.
 - a. Inspection shall be performed to determine cleanliness and profile depth of blasted surfaces and to certify that surface has been prepared in accordance with these Specifications.
 2. Schedule the abrasive blasting operation so blasted surfaces will not be wet after blasting and before painting.
 3. Perform additional blasting and cleaning as required to achieve surface preparation required. Prior to painting, reblast surfaces allowed to set overnight or surfaces that show rust bloom.
 - a. Surfaces allowed to set overnight or surfaces which show rust bloom prior to painting shall be reinspected {by NACE certified coatings inspector} prior to paint application.
 4. Profile depth of blasted surface: Not less than 1 mil or greater than 2 mils unless required otherwise by coating manufacturer.
 5. Provide compressed air for blasting that is free of water and oil. Provide accessible separators and traps.
 6. Confine blast abrasives to area being blasted.
 - a. Provide shields of polyethylene sheeting or other such barriers to confine blast material.
 - b. Plug pipes, holes, or openings before blasting and keep plugged until blast operation is complete and residue is removed.
 7. Protect nameplates, valve stems, rotating equipment, motors and other items that may be damaged from blasting.
 8. Reblast surfaces not meeting requirements of these Specifications.
 9. Abrasive blasting media may be recovered, cleaned and reused providing Contractor submits, for Engineer's review, a comprehensive recovery plan outlining all procedures and equipment proposed in reclamation process.

10. Properly dispose of blasting material contaminated with debris from blasting operation not scheduled to be reused.

G. All Plastic Surfaces and Non-Ferrous Surfaces Except Galvanized Steel:

1. Sand using 80-100 grit sandpaper to scarify surfaces.

3.5 APPLICATION

A. General:

1. Thin, mix and apply coatings by brush, roller, or spray in accordance with manufacturer's installation instructions.
 - a. Application equipment must be inspected and approved in writing by coating manufacturer.
2. Temperature and weather conditions:
 - a. Do not paint surfaces when surface temperature is below 50 DegF unless product has been formulated specifically for low temperature application or approved in writing by Engineer and paint manufacturer's authorized representative.
 - b. Avoid painting surfaces exposed to hot sun.
 - c. Do not paint on damp surfaces.
3. Immediately after surface has been inspected, apply structural steel and miscellaneous steel prime coat in the factory.
 - a. Finish coats shall be applied in the field.
 - b. Prime coat referred to here is prime coat as indicated in this Specification. Structural and miscellaneous steel prime coating applied in factory (shop) as part of Fabricator's standard rust inhibiting and protection coating is not acceptable as replacement for specified prime coating.
4. Provide complete coverage to mil thickness specified.
 - a. Thickness specified is dry mil thickness.
 - b. All paint systems are "to cover." In situations of discrepancy between manufacturer's square footage coverage rates and mil thickness, mil thickness requirements govern.
 - c. When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.
5. If so directed by Engineer, do not apply consecutive coats until Owner's Agent has had an opportunity to observe and approve previous coats.
6. Apply materials under adequate illumination.
7. Evenly spread to provide full, smooth coverage.
8. Work each application of material into corners, crevices, joints, and other difficult to work areas.
9. Avoid degradation and contamination of blasted surfaces and avoid intercoat contamination.
 - a. Clean contaminated surfaces before applying next coat.
10. Smooth out runs or sags immediately, or remove and recoat entire surface.
11. Allow preceding coats to dry before recoating.
 - a. Recoat within time limits specified by coating manufacturer.
 - b. If recoat time limits have expired reprepare surface in accordance with coating manufacturer's printed recommendations.
12. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
13. Coat all aluminum in contact with dissimilar materials.
14. Backroll concrete surfaces with a roller if paint coatings are spray applied.

B. Prime Coat Application:

1. Prime all surfaces indicated to be painted. Apply prime coat in accordance with coating manufacturer's written instructions and as written in this Section.
2. Ensure field-applied coatings are compatible with factory-applied coatings. Ensure new coatings applied over existing coatings are compatible.
 - a. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.

UC-16

- 1 b. At Contractor's option, coatings may be removed, surface reprepared, and new coating
- 2 applied using appropriate paint system listed in paragraph 2.2 E.
- 3 1) All damage to surface as result of coating removal shall be repaired to original
- 4 condition or better by Contractor at no additional cost to Owner.
- 5 3. Prime ferrous metals embedded in concrete to 1-IN below exposed surfaces.
- 6 4. Apply zinc-rich primers while under continuous agitation.
- 7 5. Ensure abrasive blasting operation does not result in embedment of abrasive particles in paint
- 8 film.
- 9 6. Brush or spray bolts, welds, edges and difficult access areas with primer prior to primer
- 10 application over entire surface.
- 11 7. Touch up damaged primer coats prior to applying finish coats. Restore primed surface equal
- 12 to surface before damage.
- 13 C. Finish Coat Application:
- 14 1. Apply finish coats in accordance with coating manufacturer's written instructions and in
- 15 accordance with this Section.
- 16 2. Touch up damaged finish coats using same application method and same material specified
- 17 for finish coat. Prepare damaged area in accordance with Article 3.4.

3.6 COLOR CODING

- 19 A. Color and band piping in accordance with Article 3.9 of this Section.
- 20 1. Band piping using maximum of three different colors at 20 FT maximum centers.
- 21 2. Place bands:
- 22 a. Along continuous lines.
- 23 b. At changes in direction.
- 24 c. At changes of elevation.
- 25 d. On both sides of an obstruction (i.e., wall, ceiling) that painted item passes through.
- 26 3. Band width for individual colors (pipe diameter measured to outside of insulation, if
- 27 applicable):
- 28 a. Piping up to 8 IN DIA: 2 IN minimum.
- 29 b. Piping greater than 8 IN up to 24 IN DIA: 4 IN minimum.
- 30 c. Piping greater than 24 IN up to 48 IN DIA: 6 IN minimum.
- 31 d. Piping greater than 48 IN DIA: 8 IN minimum.

3.7 FIELD QUALITY CONTROL

- 33 A. Maintain daily record showing:
- 34 1. Start date and time of work in each area.
- 35 2. Date and time of application for each following coat.
- 36 3. Provisions utilized to maintain temperature and humidity of work area within manufacturer's
- 37 recommended ranges.
- 38 B. Measure wet coating with wet film thickness gages.
- 39 C. Measure coating dry film thickness in accordance with SSPC PA-2 using Mikrotest gage
- 40 calibrated against National Bureau of Standards "Certified Coating Thickness Calibration
- 41 Standards."
- 42 1. Engineer may measure coating thickness at any time during project to assure conformance
- 43 with Specifications.
- 44 D. Measure surface temperature of items to be painted with surface temperature gage specifically
- 45 designed for such.
- 46 E. Measure substrate humidity with humidity gage specifically designed for such.
- 47 F. Provide wet paint signs.

3.8 CLEANING

- 49 A. Clean paint spattered surfaces. Use care not to damage finished surfaces.

5 **END OF SECTION**

SECTION 11005**EQUIPMENT: BASIC REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Requirements of this Section apply to all equipment provided on the Project including that found in Divisions 11, 12, 13, 14, 15, and 16, even if not specifically referenced in individual "Equipment" articles of those Specifications.

B. Related Sections include but are not necessarily limited to:

1. Division 1 - General Requirements.
2. Section 15060 - Pipe and Pipe Fittings: Basic Requirements.

1.2 QUALITY ASSURANCE**A. Referenced Standards:**

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. American Society for Testing and Materials (ASTM):
 - a. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
4. Institute of Electrical and Electronics Engineers (IEEE):
 - a. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
5. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment.
 - b. ICS 6, Enclosures for Industrial Control and System.
 - c. MG 1, Motors and Generators.
6. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).

B. Miscellaneous:

1. A single manufacturer of a "product" to be selected and utilized uniformly throughout Project even though:
 - a. More than one manufacturer is listed for a given "product" in Specifications.
 - b. No manufacturer is listed.
2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls, and system components shall FULLY comply with specific NEC requirements related to area classification and to NEMA 250 and ICS-6 designations
3. Utilize only year 2000 compliant equipment and software.

1.3 DEFINITIONS**A. Product: Manufactured materials and equipment.****B. Major Equipment Supports - Supports for Equipment:**

1. Located on or suspended from elevated slabs with supported equipment weighing 2000 LBS or greater, or:
2. Located on or suspended from roofs with supported equipment weighing 500 LBS or greater, or:
3. Located on slab-on-grade or earth with supported equipment weighing 5000 LBS or more.

UC-19

- C. Equipment: One or more assemblies capable of performing a complete function. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic or hydraulic connection. Not limited to items listed under "Equipment" article within specifications.
- D. Year 2000 Compliant Equipment and Software: Equipment and software for which neither performance or functionality is affected by dates prior to, during, or after the year 2000.
- E. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 1. Installer or applicator are synonymous.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. General for all equipment:
 - a. See Section 01340.
 - b. Acknowledgement that products submitted comply with the requirements of the standards referenced.
 - c. Manufacturer's delivery, storage, handling, and installation instructions.
 - d. Equipment identification utilizing numbering system and name utilized in Drawings.
 - e. Equipment installation details:
 - 1) Location of anchorage.
 - 2) Type, size, and materials of construction of anchorage.
 - 3) Anchorage setting templates.
 - 4) Manufacturer's installation instructions.
 - f. Equipment area classification rating.
 - g. Shipping and operating weight.
 - h. Equipment physical characteristics:
 - 1) Dimensions (both horizontal and vertical).
 - 2) Materials of construction and construction details.
 - i. Equipment factory primer and paint data.
 - j. Manufacturer's recommended spare parts list.
 - k. Equipment lining and coatings.
 - l. Equipment utility requirements include air, natural gas, electricity, and water.
 - 2. Mechanical and process equipment:
 - a. Operating characteristics:
 - 1) Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
 - 2) Brake horsepower requirements.
 - 3) Copies of equipment data plates.
 - b. Piping and duct connection size, type and location.
 - c. Equipment bearing life certification.
 - d. Equipment foundation data:
 - 1) Equipment center of gravity.
 - 2) Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.
 - 3. Electrical and control equipment:
 - a. Electric motor information:
 - 1) Documentation that motors provided are high efficiency units.
 - 2) Nameplate data.
 - 3) Service factor on motors 1/2 HP and above.
 - 4) Motor enclosure type.
 - 5) NEMA frame size.
 - 6) NEMA design code.
 - 7) Insulation type and temperature rise.
 - 8) Locked rotor current on motors 10 HP and above.
 - 9) Efficiency and power factor at full load, 3/4 load, and 1/2 load.

UC-20

- 10) Stall time (hot and cold) for motors 125 HP and larger.
- 11) Power factor correction data for motors 10 HP and larger. Provide recommendation from motor manufacturer giving highest capacitor size in KVAR that may be used with each motor, or provide motor manufacturer's published curve based on factory tests, showing plot of power factor versus load. For electric motors greater than 75 HP, submit the following additional information.
 - a) Motor current, efficiency and power factor at:
 - (1) Full load, 3/4 load, and 1/2 load.
 - (2) Locked rotor current.
 - (3) Stall time damage point.
 - b) Motor test reports demonstrating motor capabilities equal to or in excess of the following standard defined criteria.
 - (1) Sound level by NEMA MG 1-12.53.
 - (2) Number of starts by NEMA MG 1-12.54.
 - (3) Routine tests by NEMA MG 1-12.55.
- b. Control panels:
 - 1) Panel construction.
 - 2) Point-to-point wiring diagrams.
 - 3) Scaled panel face and subpanel layout.
 - 4) Technical product data on panel components.
 - 5) Panel and subpanel dimensions and weights.
 - 6) Panel access openings.
 - 7) Nameplate test.
 - 8) Panel anchorage.
4. Year 2000 compliant equipment and software.
 - a. Certification that equipment and software has been demonstrated to be year 2000 compliant. Provide documentation of demonstration including procedure used, location of demonstration, and date of demonstration.
5. Systems Schematics and Data:
 - a. Provide system schematics where required in system specifications.
 - 1) Acknowledge all system components being supplied as part of the system.
 - 2) Utilize equipment, instrument and valving tag numbers defined in the contract documents for all components.
 - 3) Provide technical data for each system component showing compliance with the Contract Document requirements.
 - 4) For piping components, identify all utility connections, vents and drains which will be included as part of the system.
- B. Operation and Maintenance Manuals:
 1. See Section 01340.
- C. Miscellaneous Submittals:
 1. Sample form letter for equipment field certification.
 2. Certification that equipment has been installed properly, has been initially started up, has been calibrated and/or adjusted as required, and is ready for operation.
 3. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.
 4. Field noise testing reports if such testing is specified in narrow scope sections.
 5. Field vibration testing reports if vibration testing is specified in narrow scope sections.
 6. Notification, at least 1 week in advance, that motor testing will be conducted at factory.
 7. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the supplier/installer of those interfacing systems.
 8. Motor test reports.

9. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Motors:
 - a. Siemens.
 - b. Westinghouse.
 - c. General Electric.
 - d. U.S. Motors.
 - e. Reliance Electric.
 - f. Baldor.
 2. Mechanical variable speed drives:
 - a. U.S. Motors (VariDrive).
 - b. Reeves.

- B. Submit requests for substitution to Engineer.

2.2 YEAR 2000 COMPLIANT EQUIPMENT AND SOFTWARE

- A. All equipment which utilizes microprocessors, computers, embedded chips, integrated circuits, operating systems, or PLCs shall be demonstrated to be year 2000 compliant.
- B. All software shall be demonstrated to be year 2000 compliant.
- C. Compliance Requirements:
 1. General Integrity:
 - a. Value for the current date shall not interrupt operation.
 - b. System shall return the correct date accurate to century in response to a request for current date, and software shall be unaffected by any value returned.
 2. Date Integrity: Correct results shall be returned in the operation of all legal arithmetic, logical, and calendar operations of dates that span century marks within the range of the software.
 3. Explicit Century. Software's internal date storage format shall explicitly include the century and reporting formats, allowing date representation in the full century format.
 4. Implicit Century. On encountering data that does not include the century, either from transaction input or from an external data source, the century value is unambiguously inferred by the software.

2.3 MANUFACTURED UNITS

- A. Electric Motors:
 1. Provide motors designed and applied in compliance with NEMA, IEEE, and the NEC for specific duty imposed by driven equipment.
 2. Where used in conjunction with adjustable speed AC or DC drives, provide motors that are fully compatible with the speed controllers.
 3. When used on variable frequency type adjustable speed drive applications, provide motors in compliance with NEMA MG-1, Part 31.
 4. Derate NEMA design A and B squirrel cage induction motors which will be operated from variable speed AC drive controllers in accordance with NEMA MG-1, Part 31.
 5. Design for frequent starting duty equivalent to duty service required by driven equipment.
 6. Rate for continuous duty at 40 DegC ambient. Design in accordance with the NEMA Standards for Class F insulation with Class B temperature rise above 40 DegC ambient on continuous operation or intermittent duty at nameplate horsepower.

UC-22

7. Design for full voltage starting.
8. Design bearing life based upon actual operating load conditions imposed by driven equipment.
9. Size for altitude of Project.
10. Size motors so that, under maximum continuous load imposed by driven equipment, motor nameplate horsepower for continuous operation is minimum of 15 percent more than driven load or provide motor with 1.15 service factor in which case maximum continuous load imposed shall not exceed nameplate horsepower rating of motor.
11. Provide encapsulated windings in areas designated as wet.
 - a. Provide encapsulation using a silicone or epoxy seal after the windings have been dried to less than 1 percent moisture.
12. Provide severe or chemical duty motors for use in areas designated as corrosive.
13. Furnish with clamp-type grounding terminals inside motor conduit box.
14. Furnish with oversized external conduit boxes.
15. Furnish with stainless steel nameplates with information to include all data as required by paragraph 430-7 of the National Electric Code, NFPA 70.
16. Use of manufacturer's standard motor will be permitted on integrally constructed motor driven equipment such as appliances and hand tools specified by model number in which a redesign of complete unit would be required in order to provide a motor with other features as may be specified herein.
17. Electric motors less than 1/3 HP.
 - a. Single phase, 60 HZ, suitable for supply voltage shown on Drawings.
 - b. Totally enclosed non-ventilated (TENV) or totally enclosed fan cooled (TEFC).
 - c. Permanently lubricated sealed bearings conforming to ABMA Standards.
 - d. Built-in manual-reset thermal protector or furnished with integrally mounted stainless steel enclosed manual motor overload switch.
18. Electric motors 1/3 to 1 HP inclusive:
 - a. Single or 3 PH, 60 HZ, suitable for supply voltage and phase shown on Drawings.
 - b. Totally enclosed non-ventilated (TENV) or totally enclosed fan cooled (TEFC).
 - c. Specially insulated for use in damp locations below 20 DegC.
 - d. Permanently lubricated sealed bearings conforming to ABMA Standards.
19. Electric motors 1-1/2 through 10 HP:
 - a. 230/460 V, 60 HZ, 3 PH voltage supply.
 - b. Totally enclosed fan cooled (TEFC).
 - c. Specially insulated for use in damp locations below 20 DegC.
 - d. Permanently lubricated sealed bearings conforming to ABMA Standards.
 - e. For vertical motors, provide 15-year, average-life thrust bearings conforming to ABMA Standards.
20. Electrical motors greater than 10 HP.
 - a. 230/460 V, 60 HZ, 3 PH supply voltage.
 - b. Totally enclosed fan cooled (TEFC).
 - c. Specially insulated for use in damp locations below 20 DegC.
 - d. Oil or grease lubricated antifriction bearings conforming to ABMA Standards. Design bearing life for 90 percent survival rating at 50,000 HRS of operation for motors up to and including 100 HP and at 100,000 HRS of operation for motors greater than 100 HP.
 - e. Thermal protection:
 - 1) Two integral thermal protectors per phase for motors 100 HP and larger suitable for connection in pilot control circuit.
 - f. Provide resistance type winding temperature protection included in each phase winding to detect "hot spots."
 - g. Remote mount controller in motor starter. Energize controller from starter control power circuit. Rate controller interrupting contacts at 120/240 V AC.
 - h. Where motors are located in hazardous classified areas Divisions 1 and 2, provide box for potting compound to seal connections in accordance with NEMA MG 1-12.52.
 - i. For vertical motors, provide 15-year average life thrust bearings conforming to ABMA Standards.

UC-23

21. Motors 15 HP and above having a locked rotor inrush KVA greater than 6.3 times motor horsepower are not acceptable.
22. Provide high efficiency rated motors. Where high efficiency motors are not available because of motor size or application, clearly document within the shop drawing submittal process.
23. Motors 20 HP and larger shall be corrected to 94 to 96 percent lagging power factor with use of power factor correction capacitors.
24. Measure efficiencies by IEEE 112 - Method B (Method E may be used for vertical motors 50 HP and larger. Vertical motors may eliminate thrust bearing losses for efficiency measurements).

B. V-Belt Drive:

1. Provide each V-belt drive with sliding base or other suitable tension adjustment.
2. Provide V-belt drives with a service factor of at least 1.6 at maximum speed.
3. Provide staticproof belts.

C. Mechanical Variable Speed Drives:

1. Oil-lubricated shaft-mounted reduction gear drive capable of 300 percent shock load and providing a 1.5 service factor in accordance with AGMA.
2. Assure infinite speed adjustment over a { }:1 range.
3. Secure drive to equipment base.
4. Flexible coupling between drive shaft and equipment shaft.

2.4 COMPONENTS

A. Gear Drives and Drive Components:

1. Size drive equipment capable of supporting full load including losses in speed reducers and power transmission.
2. Provide nominal input horsepower rating of each gear or speed reducer at least equal to nameplate horsepower of drive motor.
3. Design drive units for 24 HR continuous service, constructed so oil leakage around shafts is precluded.
4. Utilize gears, gear lubrication systems, gear drives, speed reducers, speed increasers and flexible couplings meeting applicable standards of American Gear Manufacturers Association.
5. Gear reducers:
 - a. Provide gear reducer totally enclosed and oil lubricated.
 - b. Utilize antifriction bearings throughout.
 - c. Provide worm gear reducers having a service factor of at least 1.20.
 - d. Furnish other helical, spiral bevel, and combination bevel-helical gear reducers with a service factor of at least 1.50.

2.5 ACCESSORIES

A. Guards:

1. Provide each piece of equipment having exposed moving parts with full length, easily removable guards, meeting OSHA requirements.
2. Interior applications:
 - a. Construct from expanded galvanized steel rolled to conform to shaft or coupling surface.
 - b. Utilize non-flattened type 16 GA galvanized steel with nominal 1/2 IN spacing.
 - c. Connect to equipment frame with hot-dip galvanized bolts and wing nuts.
3. Exterior applications:
 - a. Construct from 16 GA stainless steel or aluminum.
 - b. Construct to preclude entrance of rain, snow, or moisture.
 - c. Roll to conform to shaft or coupling surface.
 - d. Connect to equipment frame with stainless steel bolts and wing nuts.

B. Anchorage:

UC-24

1. Cast-in-place anchorage:
 - a. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment.
 - b. Configuration and number of anchor bolts shall be per manufacturer's recommendations.
 - c. Provide two nuts for each bolt.
2. Drilled anchorage:
 - a. Epoxy grout.
 - b. Threaded rods same as cast-in-place.
- C. Data Plate:
 1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.
 2. Permanently stamp information on data plate including manufacturer's name, equipment operating parameters, serial number and speed.
- D. Gages:
 1. Provide gages.
 2. Provide at the following locations:
 - a. Inlet and outlet of all reciprocating, centrifugal and positive displacement mechanical and process equipment.
 - b. At locations identified on Drawings.
 3. Utilize tapping sleeves for mounting per Section 15060.
- E. Lifting Eye Bolts or Lugs:
 1. Provide on all equipment 50 LBS or greater.
 2. Provide on other equipment or products as specified in the narrow specifications.

2.6 FABRICATION

- A. Design, fabricate, and assemble equipment in accordance with modern engineering and shop practices.
- B. Manufacture individual parts to standard sizes and gages so that repair parts, furnished at any time, can be installed in field.
- C. Furnish like parts of duplicate units to be interchangeable.
- D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.
- E. Furnish equipment which requires periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping or equipment or similar major efforts. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.
- F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option. Provide drain connection for 3/4 IN PVC tubing.
- G. Machine the mounting feet of rotating equipment.
- H. Fabricate equipment which will be subject to Corrosive Environment in such a way as to avoid back to back placement of surfaces that can not be properly prepared and painted. When such back to back fabrication can not be avoided, provide continuous welds to seal such surfaces from contact with corrosive environment. Where continuous welds are not practical, after painting seal the back to back surfaces from the environment.

2.7 SHOP OR FACTORY PAINT FINISHES

- A. Electrical Equipment:
 1. The standard factory-applied paint coating system(s) of the approved manufacturers of the following equipment are acceptable:
 - a. Panel boards.
 - b. Electrical panels.

UC-25

- c. Switchboards.
- d. Switchgear.
- e. Safety switches.
- f. Motor starter equipment.
- g. Motor control centers.
- h. Busways.
- i. Raceways and cable trays.
- j. Transformers.
- k. Engine generator sets.
- l. Power circuit breakers.
- m. Exterior substation galvanized structural steel.
2. As an alternate to the acceptable standard factory-applied paint coating systems, a manufacturer may provide a paint coating system in accordance with Section 09905.

B. Other Equipment: In accordance with Section 09905.

2.8 SOURCE QUALITY CONTROL

A. Motor Tests:

1. Test motors in accordance with NEMA and IEEE procedures. Include the following:
 - a. Routine test:
 - 1) Running no-load amperes.
 - 2) Locked rotor amperes.
 - 3) Winding resistance, DC.
 - 4) High-potential test at twice rated voltage plus 1000 V, with a minimum of 2200 V for 1 minute, winding to ground.
 - 5) Vibration check.
 - 6) Wound-rotor motor, secondary volts at collector rings.
 - b. Complete test:
 - 1) Rated load temperature rise.
 - 2) Slip in percent.
 - 3) Locked rotor amperes (3 PH, full voltage).
 - 4) Locked rotor torque.
 - 5) Breakdown torque.
 - 6) High potential test; see paragraph 4) above.
 - 7) Efficiencies tabulated at 100, 75, and 50 percent of full load.
 - 8) Power factor tabulated at 100, 75, and 50 percent of full load.
 - 9) Wound - rotor motor, secondary volts at collector rings.
2. Provide routine test for motors 5 through 75 HP.
3. Provide routine and complete test for motors 100 HP and larger. Commercial test will be acceptable if test results can be compared to results from identical motors and projected to the results for a complete test.
4. The Owner reserves the right to, at any time, select and have tested any motor included within the Project. If motor passes testing requirements, Owner will be responsible for any shipping and testing costs incurred. Costs shall be determined by current freight rates and manufacturer's published rates at the time of the test. If motor fails test, Contractor shall be responsible for all costs incurred. If two successive motors fail the test, the Owner has the right to reject any or all motors from that manufacturer. The Owner also reserves the right to witness any routine or complete tests at Owner's expense.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment as shown on Drawings and in accordance with manufacturer's directions.
- B. Utilize templates for anchorage placement for slab-mounted equipment.

UC-26

- C. For equipment having drainage requirements such as seal water, provide 3/4 IN PVC or clear plastic tubing from equipment base to nearest floor or equipment drain. Route clear of major traffic areas and as approved by Engineer.
- D. DO NOT construct foundations until major equipment supports are approved.
- E. Extend all non-accessible grease fittings using stainless steel tubing to a location which allows easy access of fittings.
- F. Construct subbases, either concrete, steel or cast iron, level in both directions. Particular care shall be taken at hold-down bolt locations so these areas are flat and level.
- G. Machine Base:
 - 1. Mount machine bases of rotating equipment on subbases in manner that they are level in both directions according to machined surfaces on base. Use machinist level for this procedure.
 - 2. Level machine bases on subbases and align couplings between driver and driven unit using steel blocks and shims.
 - a. Size blocks and shims to provide solid support at each anchor bolt location. Area size of blocks and shims shall be approximately 1-1/2 times area support surface at each anchor bolt point.
 - b. Provide blocks and shims at each anchor bolt. Blocks and shims that are square shape with "U" cut out to allow blocks and shims to be centered on anchor bolts.
 - c. After all leveling and alignment has been completed and before grouting, tighten anchor bolts to proper torque value.
 - d. Do not use nuts below the machine base on anchor bolts for base leveling.
- H. Couplings:
 - 1. Align in the annular and parallel positions.
 - a. For equipment rotating at 1200 rpm or less, align both annular and parallel within 0.001 IN tolerance for couplings 4 IN size and smaller. Couplings larger than 4 IN size: Increase tolerance 0.0005 IN per inches of coupling diameter, i.e., allow 6 IN coupling 0.002 IN tolerance, and allow a 10 IN coupling 0.004 IN tolerance.
 - b. For equipment rotating at speeds greater than 1200 rpm allow both annular and parallel positions within a tolerance rate of 0.00025 IN per inch coupling diameter.
 - 2. If equipment is delivered as a mounted unit from factory, verify factory alignment on site after installation and realigned if necessary.
 - 3. Check surfaces for runout before attempting to trim or align units.
- I. Grouting:
 - 1. After machine base has been shimmed, leveled, couplings aligned and anchor bolts tightened to correct torque value, a dam or formwork shall be placed around base to contain grouting. Extend dam or formwork at least 1/2 IN above the top of leveling shims and blocks.
 - 2. Saturate top of roughened concrete subbase with water before grouting. Add grout until entire space under machine base is filled to the top of the base underside. Puddle grout by working a stiff wire through the grout and vent holes to work grout in place and release any entrained air in the grout or base cavity.
 - 3. When the grout has sufficiently hardened, remove dam or formwork and finish the exposed grout surface to fine, smooth surface. Cover exposed grout surfaces with wet burlap and keep covering sufficiently wet to prevent too rapid evaporation of water from the grout. When the grout has fully hardened (after a minimum of 7 days) tighten all anchor bolts and recheck driver-driven unit for proper alignment.
- J. Power Factor Correction Capacitors:
 - 1. Connect capacitors on the load side of the motor starting contacts and on the line side of the overload relay.
 - 2. Mount capacitors on top of or on the wall above MCCs.

3.2 INSTALLATION CHECKS

- 1 A. For all equipment specifically required in detailed specifications, secure services of experienced,
2 competent, and authorized representative(s) of equipment manufacturer to visit site of work and
3 inspect, check, adjust and approve equipment installation. In each case, representative(s) shall be
4 present during placement and startup of equipment and as often as necessary to resolve any
5 operational issues which may arise.
- 6 B. Secure from equipment manufacturer's representative(s) a written report certifying that
7 equipment:
8 1. Has been properly installed and lubricated.
9 2. Is in accurate alignment.
10 3. Is free from any undue stress imposed by connecting piping or anchor bolts.
11 4. Has been operated under full load conditions and that it operated satisfactorily. Secure and
12 deliver a field written report to Owner immediately prior to leaving jobsite.
- 13 C. No separate payment shall be made for installation checks. All or any time expended during
14 installation check does not qualify as O&M training or instruction time when specified.

15 **3.3 IDENTIFICATION OF EQUIPMENT AND HAZARD WARNING SIGNS**

- 16 A. Identify equipment and install hazard warning signs as required.

17 **3.4 FIELD PAINTING AND PROTECTIVE COATINGS**

- 18 A. For required field painting and protective coatings, comply with Section 09905.

19 **3.5 WIRING CONNECTIONS AND TERMINATION**

- 20 A. Clean wires before installing lugs and connectors.
- 21 B. Coat connection with oxidation eliminating compound for aluminum wire.
- 22 C. Terminate motor circuit conductors with copper lugs bolted to motor leads.
- 23 D. Tape stripped ends of conductors and associated connectors with electrical tape. Wrapping
24 thickness shall be 150 percent of the conductor insulation thickness.
- 25 E. Connections to carry full ampacity of conductors without temperature rise.
- 26 F. Terminate spare conductors with electrical tape.

27 **3.6 FIELD QUALITY CONTROL**

- 28 A. Furnish equipment manufacturer services as specified in the individual equipment specifications.
- 29 B. Inspect wire and connections for physical damage and proper connection.
- 30 C. For motor 50 HP and above, conduct insulation resistance (megger) test on each motor before
31 energized. Conduct test with 500 or 1000 V DC megger. Test each phase separately and follow
32 procedures listed below:
33 1. Disconnect voltage sources, lightning arrestors, capacitors, and other potential low
34 insulation sources from motor before connecting megger to motor.
35 2. When testing a phase, connect phases not under test to ground.
36 3. Apply test voltage, phase to ground, on each phase being tested. Record resistance reading
37 at 30 seconds and at one minute after test voltage is applied. Divide one minute reading by
38 30 second reading to obtain dielectric absorption ratio (DAR). DAR must be 1.25 or greater
39 for phase to pass test.
40 4. If phases have a DAR of 1.25 or greater, attach a tag to the motor and mark tag "Insulation
41 Resistance Test OK" and sign.
42 5. Connect equipment removed in paragraph 1 above.
- 43 D. Check rotation of motor before connection to driven equipment, before couplings are bolted or
44 belts installed. Before motor is started to check rotation, determine that motor is lubricated.

UC-28

- 1 E. Subbase that supports the equipment base and that is made in the form of a cast iron or steel
2 structure that has supporting beams, legs and cross member that are cast welded or bolted, shall
3 be tested for a natural frequency of vibration after equipment is mounted. Keep the ratio of the
4 natural frequency of the structure to the frequency of the disturbing force out of the range from
5 0.5 to 1.5.

6 **3.7 DEMONSTRATION**

- 7 A. Demonstrate equipment to satisfaction of Engineer.

8 **END OF SECTION**
9

SECTION 11060**PUMPING EQUIPMENT: BASIC REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY**

- A. The Contractor shall furnish all labor, materials, tools, equipment, and perform all work and services necessary for or incidental to the furnishing and installation, complete, of all wastewater pumping equipment and miscellaneous appurtenances as shown on drawings and as specified, in accordance with provisions of the Contract Documents, and completely coordinated with work of all other trades.
1. Work included in this section consists of, but is not necessarily limited to the following:
 - a. Installation of four (4) duplex submersible pump stations.
 - b. Installation and removal devices.
 - c. Control Panels and float-switches.
 - d. Access doors.
 - e. Power service details.
 - f. Site work including grading and piping as shown on plans.
 2. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure, complete and compatible installation shall be furnished and installed as part of this work
 3. Related Sections include but are not necessarily limited to:
 - a. Division 1 - General Requirements.
 - b. Section 09905 - Painting and Protective Coatings.
 - c. Section 11005 – Equipment: Basic Requirements.
 - d. Section 11076 – Pumping Equipment: Submersible Non-Clog.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. Hydraulic Institute (HI):
 - a. Standards for centrifugal, rotary and reciprocating pumps.

1.3 SUBMITTALS

- A. Shop Drawings:
1. See Section 11005.
 2. Product technical data including:
 - a. Performance data and curves with flow (gpm), head (FT), horsepower, efficiency, NPSH requirements, submergence requirement.
 - b. Pump accessory data.
 - c. Bearing supports, shafting details and lubrication provisions.
 - d. Solids passage information.
 3. Certifications:
 - a. Certified pump performance curves.
- B. Operation and Maintenance Manuals:
1. See Section 01340.
- C. Miscellaneous:
1. Certifications:
 - a. Statement relative to installation and start-up per paragraph 3.2-A.4.

PART 2 - PRODUCTS**2.1 ACCEPTABLE MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Pumps:
 - a. See individual pump specification sections.
 - 2. Mechanical seals:
 - a. Chesterton.
 - b. Garlock.
 - c. Or approved equal.
- B. Submit requests for substitution to Engineer.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. See Section 11005.
- B. Submersible Units:
 - 1. Assemble connecting piping with gaskets in place and minimum of four bolts per joint installed and tightened. Test alignment by loosening flange bolts to see if there is any change in relationship of piping flange with equipment connecting flange. Realign as necessary, install flange bolts and make equipment connection.
 - 2. Provide pressure gage on discharge of all pumps and on suction of all non-submersible units.

3.2 FIELD QUALITY CONTROL

- A. Provide services of equipment manufacturer's field service representative(s) to:
 - 1. Inspect equipment covered by these Specifications.
 - 2. Supervise pre-start adjustments and installation checks.
 - 3. Conduct initial startup of equipment and perform operational checks.
 - 4. Provide a written statement that manufacturer's equipment has been installed properly, started up and is ready for operation by Owner's personnel.
 - 5. Instruct Owner's personnel for a minimum number of 24 hours at jobsite on operation and maintenance of Section 11076.

END OF SECTION

1

2

SECTION 11076

3

PUMPING EQUIPMENT: SUBMERSIBLE NON-CLOG

4

PART 1 - GENERAL

5

1.1 SUMMARY

6

A. Section Includes:

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1. Submersible non-clog pumps - wet pit application.

8

B. Related Sections include but are not necessarily limited to:

9

1. Division 1 - General Requirements.

10

2. Section 11005 - Equipment: Basic Requirements.

11

3. Section 11060 - Pumping Equipment: Basic Requirements.

12

1.2 QUALITY ASSURANCE

13

A. Referenced Standards:

14

1. American Iron and Steel Institute (AISI):

15

- a. Steel Products Manual.

16

2. American National Standard Institute (ANSI).

17

3. American Society for Testing and Materials (ASTM):

18

- a. A48, Standard Specification for Gray Iron Castings.

19

4. Factory Mutual (FM).

20

5. Hydraulic Institute Standards for Centrifugal, Rotary and Reciprocating Pumps (HI).

21

6. National Electrical Manufacturer's Association (NEMA):

22

- a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

23

- b. ICS 6, Enclosures for Industrial Controls.

24

7. National Fire Protection Agency (NFPA):

25

- a. 70, National Electrical Code (NEC).

26

8. Underwriters Laboratories, Inc.(UL).

27

1.3 SUBMITTALS

28

A. Shop Drawings:

29

1. Requirements in Section 11060.

30

2. Product technical data including:

31

- a. Acknowledgement that products submitted meet requirements of standards referenced.

32

- b. Manufacturer's installation instructions.

33

B. Operation and Maintenance Manuals:

34

1. See Section 01340.

35

PART 2 - PRODUCTS

36

2.1 ACCEPTABLE MANUFACTURERS

37

- A. The City of Albemarle has standardized on "ITT Flygt/ Xylem" submersible pumps. No substitutions will be allowed.

38

39

2.2 MATERIALS

40

A. Wet Pit Applications (East Main Pump Station):

41

1. Pump case: Cast iron, ASTM A48, Class 30.

42

2. Motor housing: Cast iron, ASTM A48, Class 25.

- 1 3. Impeller: Cast iron, ASTM A48, Class 30.
- 2 4. Shaft: Stainless steel, ANSI, Series 300 or 400.
- 3 5. Wear rings: Corrosion and wear resistant materials.
- 4 6. O-rings: Buna-N or Nitrile rubber or neoprene.
- 5 7. Fasteners: Stainless steel.
- 6 8. Guide rails: Stainless steel.
- 7 9. Lifting chains and cables: Stainless steel.
- 8 10. Lower ring seal: Tungsten-carbide both faces.
- 9 11. Upper ring seal: Tungsten-carbide both faces or carbon and ceramic or carbon and Ni-resist.
- 10 12. Seal metal parts: Stainless steel.

11 2.3 EQUIPMENT

- 12 A. East Main Pump Station:
- 13 1. Design condition: 155 gpm at 89 FT TDH with minimum pump efficiency of 25 percent.
 - 14 2. Minimum Shutoff condition: 0 gpm at 100 FT.
 - 15 3. Pump configuration:
 - 16 a. Submersible wet pit.
 - 17 4. Maximum pump speed: 1800 rpm.
 - 18 5. Maximum driver horsepower: 15.
 - 19 6. Drive type: RVAT Constant speed.
 - 20 7. Minimum solids passage: 3 IN.

21 2.4 COMPONENTS

- 22 A. General:
- 23 1. Provide pumps capable of handling raw, unscreened sewage.
 - 24 2. Where watertight sealing is required, machine and fit mating surfaces with O-rings.
 - 25 3. Provide with heavy duty lift lugs or hoisting bail designed for lifting the entire pump and
 - 26 motor assembly.
- 27 B. Impeller:
- 28 1. Provide nonclog-type dynamically balanced impeller in accordance with HI Standards.
 - 29 2. Provide impeller and volute wear rings as necessary to assure efficient sealing between
 - 30 volute and impeller.
- 31 C. Shaft:
- 32 1. Design pump shaft of sufficient size to transmit full driver output.
 - 33 2. Use shaft which is accurately machined and constructed with sufficient materials.
 - 34 3. Design shaft for a maximum deflection of 0.002 IN measured at the stuffing box.
- 35 D. Shaft Seal:
- 36 1. Seal shaft with double mechanical seal running in an oil filled chamber.
 - 37 2. Provide seals requiring neither routine maintenance nor adjustment, but capable of being
 - 38 easily inspected and replaced.
 - 39 3. Hold interface in contact by its own spring system.
- 40 E. Bearings:
- 41 1. Support shaft on upper and lower permanently lubricated bearings with a minimum B-10
 - 42 life of 40,000 HRS.
- 43 F. Motors:
- 44 1. Provide pump with FM or UL listed motor designed for area classification shown on
 - 45 Drawings.
 - 46 2. Provide motor of totally submersible design, constructed with epoxy or poly-seal
 - 47 encapsulated windings, air-filled or dielectric oil filled, with Class F insulation and rated for
 - 48 continuous duty operation.
 - 49 3. Motor shall be 3 PH, 60 cycle, 480 V.
 - 50 4. Assure motor is capable of running dry for extended periods without damage to motor or
 - 51 seal.

UC-33

G. Power and Control Cables:

1. Provide power cable and control cable to pump suitable for submersible applications in wastewater and indicate same by a code or legend permanently embossed on cables.
2. Size cables in accordance with applicable NEC specifications.
3. Provide sufficient power cable and control cable to reach control panel without splicing.
4. Provide each cable with a strain relief, cord grip, and explosionproof seal installed in accordance with NEC Article 500.
5. Provide a separate conduit for each power cable and one for control cables.

H. Temperature Monitor:

1. Furnish each phase of the motor with a temperature monitor embedded in the motor windings.
2. Arrange controls so as to shut the pump down and sound alarm should any one of the monitors detect high temperature and automatically reset once the motor temperature returns to normal.
3. Set temperature of the temperature monitors at not higher than 90 percent of insulation temperature rating.

I. Coatings:

1. Protect all metallic surfaces coming into contact with sewage except stainless steel and bronze by a corrosion-resistant coating.

J. Wet Pit Applications:

1. Provide sliding guide bracket integral to pump unit which properly aligns the pump discharge with the discharge connection elbow for watertight seal during pumping.
2. Guide the entire weight of the pumping unit by guide rail(s).
3. The guide rail(s) shall not support any portion of the weight of the pump.
4. Provide stainless steel chains or cable of sufficient strength to lift pumps from sump.
5. Furnish guiding rail assembly and the discharge flange assembly of nonsparking components.
6. Design pump to allow for removal without entering the wet well and without removal of bolts, nuts or other fastenings.
7. Provide pump unit connecting to discharge connection with a simple downward motion without rotation.
8. Provide necessary sliding guide bracket and discharge connection which, when bolted to the floor of the sump and to the discharge line, will receive the pump discharge connecting flange without need of adjustment, fasteners, clamp, or similar devices.
9. No portion of the pump shall bear directly on the floor or the wet well.
10. Provide watertight sealing between pump discharge and elbow.

2.5 ACCESSORIES

A. See Section 11060.

B. Controls:

1. Provide four sealed float-type mercury switches to control pumps and provide alarm signal.
2. Seal mercury tube switches in a solid polypropylene float.
3. Provide float with large radius top at electrical cable connection to assure trouble-free operation.
4. Suspend floats on their own cable.
5. Provide floats to operate at elevation shown on Drawings.
6. Design floats to be field-adjustable.
7. Three floats are to control pumps: One for lead pump start, one for lag pump start and one for low water cutoff. An additional switch provides the signal for high level alarm.
8. Provide an intrinsically safe relay for each level control circuit to reduce the energy in the circuit to the point that no spark is created by switching.

C. Control Panel:

UC-34

1. Furnish and install locally mounted automatic control panel at location shown on Drawings and rated for area classification.
2. Include combination circuit breaker type controller with short circuit, overload, and three overload relays, interior-mounted motor starter(s), and transformer with disconnect and overload protection for control circuit of 24 V.
3. Include a terminal board for connection of level sensors.
4. Provide the following features:
 - a. NEMA 4X stainless steel watertight enclosure with continuous hinge, neoprene gasket in cover and continuous seam weld. Include locking mechanism complete with padlock.
 - b. Hand-Off-Automatic selector switches.
 - c. Automatic alternator.
 - d. High level alarm with alarm horn, and alarm light.
 - e. Pump running lights.
 - f. Elapsed time meters.
 - g. Overload reset button to reset overload relays.
 - h. Pump sequence selector switch which overrides automatic alternator.
 - i. Lightning protection.
 - j. Condensation heater.
 - k. Moisture detector alarm light and pump shutdown.
 - l. 100 watt utility light outlet.
 - m. Float switch test pushbuttons.
 - n. Inner door in cabinet-mounted on a continuous vertical steel hinge; size to completely cover wiring and components mounted on back panel; provide for mounting of controls and instruments on inner door.

D. Access Doors and Frames:

1. Furnish and install double hinged door constructed of aluminum.
2. Furnish size shown on Drawings.
3. Equip with nonsparking upper guide rail support, float bracket, and flush locking mechanism.
4. Door shall be able to remain in open position while work is being performed.
5. Securely place frame above pump(s).
6. Provide doors of skidproof design.
7. Provide doors with snap locks and removable handle.
8. Provide door hardware including latching mechanism and hinges of stainless steel materials.

E. Portable Davit Crane:

1. Furnish and install one portable davit crane assembly per each installed wet well.
2. Unit shall be "Thern" series 5110 or equal installed with pedestal base, zinc plated spur gear winch and stainless steel wire rope of a length capable of reaching all installed pumping equipment in the wet well.
3. Unit shall be supplied in factory applied corrosion resistant electrostatic powder coated finish.

2.6 SOURCE QUALITY CONTROL

- A. Secure from the pump manufacturer the following inspections and tests on each pump before shipment from factory:
 1. Check impeller, motor rating and electrical connections for compliance with Specification.
 2. Test motor and cable insulation for moisture content or insulation defects.
 3. Prior to submergence, run pump dry to establish correct rotation and mechanical integrity.
 4. Run pump for 30 minutes submerged, a minimum of 6 FT under water.
 5. After operational test #4, perform insulation test (#2) again.
- B. Factory test of head (FT) versus flow (gpm) for one pump of each service category as specified in Section 11060.

END OF SECTION

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SECTION 11562**ENGINE GENERATORS: DIESEL****PART 1 - GENERAL**

This specification details the requirements for standby generators to be used as back up power source for the wastewater pump stations.

1.1 SUMMARY**A. Section Includes:**

1. Engine-generator set.
2. Provide engine generator set including but not necessarily limited to the following:
 - a. Engine.
 - b. Cooling system.
 - c. Exhaust system.
 - d. Mounting.
 - e. Starting system.
 - f. Generator.
 - g. Control equipment and accessories.
 - h. Sound attenuating enclosure.
 - i. Skid mounted fuel storage tank.
 - j. 3 pole double throw automatic transfer switch.

1.2 QUALITY ASSURANCE**A. Referenced Standards:**

1. National Electrical Code (NEC).
2. National Electrical Manufacturer's Association (NEMA).
3. Underwriter's Laboratories, Inc., (UL).
4. National Fire Protection Association (NFPA).

B. Testing:

1. Prototype Test: The manufacturer shall have successfully tested a prototype of each engine/generator set series offered. The tests performed shall include the following:
 - a. Maximum power test.
 - b. Maximum motor starting kVA.
 - c. Transient response, steady state governing, and voltage regulation.
 - d. Single step load pick-up per NFPA 110.
 - e. Harmonic analysis and wave form deviation per MIL-STD-705B, Method 601.4.
 - f. Three-phase short circuit test for mechanical and electrical strength.
 - g. Fuel consumption.
 - h. Cooling system test.
 - i. Endurance run test.
 - j. Torsiograph analysis and test.
 - k. Temperature rise test.
2. Factory Tests: Prior to shipment, each unit shall be factory performance tested under load. Test results shall be certified and documented on a strip chart recorder. The tests shall be performed in accordance with the Manufacturer's standards and NFPA Standard 110. The following tests shall be performed:
 - a. Stepped load test at 1/2, 3/4, and full load for 5 minutes each step.
 - b. Three-quarter block load.
 - c. Full single step block load.
 - d. Results documented shall include steady-state voltage and frequency analysis, transient response, maximum power analysis, and fuel consumption.

UC-37

3. Field Tests: Each unit delivered shall be tested for compliance with the specifications following delivery to site. Testing shall be conducted by a representative of the supplier. The Owner shall supply fuel and other equipment required for the test. The tests shall be repeated until the equipment performs as specified. The tests to be conducted on site shall be as follows:
 - a. Cold Start Test: Perform a cold start test on the generator using the generator's actual load as a test load.
 - 1) Time delay on start.
 - 2) Cranking on time.
 - 3) Time required to come up to speed.
 - 4) Voltage and frequency overshoot.
 - 5) Time to achieve steady state.
 - 6) Voltage, frequency, and amps at standby state.
 - 7) Oil pressure, water temperature, and battery charge rate at 5 minute intervals for the first 15 minutes and at 15 minute intervals thereafter for 2 hours.
 - 8) Cool-down time delay.
 - b. Full Load Test: Immediately after cooling time from cold start test, perform a one step full load test using a load bank. Record the same data as in the cold start test.
 - c. Crank Cycle Test: Disable the generator from starting by a method approved by the Manufacturer and test the crank cycle by switching the generator to run.
 - d. Safety Shutdowns: Test all the generator safety shutdowns.

1.3 SUBMITTALS

- A. Shop drawings shall be provided detailing outline dimensions, mechanical and electrical field connections, operator control panel layout, as well as generator load data including but not limited to starting KVA, continuous load KW, voltage regulation, frequency regulation, voltages available, full load amps, and fault current amps.

1.4 WARRANTY

- A. Comply with General Conditions.
- B. Manufacturers standard warranty for not less than one year after delivery to customer.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to Contract Documents the following manufacturers are acceptable:
 1. Generator:
 - a. Caterpillar
 - b. Cummins/Onan
 - c. Kato
 - d. Kohler
 - e. or approved equal.
 2. Transfer Switch:
 - a. Asco
 - b. Zenith
 - c. Russel Electric
 - d. Onan
 - e. or approved equal.
- B. Assure engine, generator and accessories are provided by the engine manufacturer and its authorized dealer.
- C. Assure local availability of service and replacement parts.

2.2 PERFORMANCE AND OPERATING REQUIREMENTS

UC-38

- A. Operating Conditions: Provide complete generator set, controls and accessories rated for the following conditions:
1. Elevation: Sea level to 1,000 ft.
 2. Ambient air temperature: 120 DegF (maximum), 0 DegF (minimum).
 3. Fuel: #2 diesel.
 4. Enclosure rating: NEMA 3R outdoor, sound attenuated.
- B. Performance: Establish net rating of each generator set under operating conditions specified when equipped and fully loaded with all necessary operating accessories. Substantiate ratings with manufacturer's standard published curves and data.
1. Ratings:
 - a. Frequency: 60 HZ.
 - b. Voltage and phase: 480Volt, 3 phase.
 - c. Engine speed, max.: 1800 rpm.
 - d. Maximum voltage dip: 20 percent.
 2. Connected Load:

Connected Loads				
Generator	Location	1 st Pump	2 nd Pump	Fixed Load
1	East Pump Station	15 HP	15 HP	7.5 kva

- a. Pumps are controlled by reduced voltage auto-transfer non-reversing starters.
 - b. The start of second pump will be delayed at least 30 seconds after start of first pump.
 - c. Size shown on the electrical plan is suggested value; Contractor is responsible for providing generator manufacturer with actual motor name plate data for correct sizing of stand-by generator. Any discrepancy shall be informed to the Engineer.
- C. Fuel: Engines requiring special or premium fuel will not be acceptable.

2.3 ENGINE

- A. Engine Construction: Provide diesel-type engine of heavy-duty construction, full compression ignition diesel, water cooled, "V" type multi-cylinder, four stroke, two or four cycle.
1. Engines solid-state designed for cold quick start, capable of delivering full load output in 10 seconds.
 2. Engine must meet scheduled performance without turbo charging or after cooling.
 3. Ensure engines have replaceable cylinder liners of wet sleeve-type and replaceable valve seat inserts.
 4. Design combustion chambers of open type.
 5. Cross tie bolt main bearing caps to crankcase for rigidity.
 6. Design connecting rods of forged steel, angle split line for precise cap alignments. Design crankshaft of forged steel.
 7. Provide exhaust manifolds.
- B. Lubrication:
1. Provide pressure-type lubrication system with gear-type oil pump and full flow filters fitted to engines. Provide pressure regulating valve. Provide level indicator or dipstick.
 2. Locate filter for convenient servicing. Equip filters with spring loaded bypass to ensure oil circulation if filters are clogged.
 3. Oil drain piped to edge of skid with valve or cap.
- C. Air Cleaner:
1. Provide one or more dry-type replaceable element air cleaners suitable for high dust load operation.
 2. Equip each air cleaner with service indicator.
- D. Governor:
1. Provide a mechanical governor integral with fuel pump.
 2. Frequency at any constant load shall not deviate more than ± 0.5 percent of rated frequency.

UC-39

- 1 3. The governor to provide adjustable frequency regulation from isochronous to 5% droop.
- 2 E. Fuel System: Dual replaceable element filter, engine supply and return line, solenoid shut off
- 3 valve, and engine driven fuel pump.

4 2.4 GENERATOR

- 5 A. Construction: Provide brushless, revolving field type, synchronous generator coupled directly to
- 6 engine flywheel through a flexible driving disc for positive alignment.
- 7 1. Bolt generator housing directly to engine flywheel housing.
- 8 2. Provide double ball-bearing support for the rotor in the generator housing. Dynamically
- 9 balance rotor for up to 25 percent overspeed.
- 10 3. Provide Class H insulation operating on Class F temperature rise on the stator and rotor, and
- 11 protect with 100 percent epoxy impregnation and an overcoat of resilient insulating material
- 12 to reduce possible fungus and abrasion deterioration. Equip field with full amortisseur
- 13 winding.
- 14 4. Perform generator field excitation with static-type rotating exciter mounted on the generator
- 15 rotor shaft through a brushless rotating diode system.
- 16 5. Provide volts-per-hertz type voltage regulator of solid state 3-phase sensing, construction
- 17 matching characteristics of each unit. Provide no load to full load regulation within +/- 0.5
- 18 percent at rated voltage during steady state conditions.
- 19 6. Provide permanent magnet generator to provide excitation power to the automatic voltage
- 20 regulator.
- 21 7. Provide shock-resistant mounting of regulators.

22 2.5 COOLING SYSTEM

- 23 A. Provide unit-mounted radiator cooling system with sufficient capacity for cooling generator set
- 24 at full rated load and operating conditions specified.
- 25 1. Equip engine with engine-driven centrifugal-type water circulating pumps and thermostatic
- 26 valve to maintain coolant temperature below 200 DegF.
- 27 B. Coolant:
- 28 1. Flush and drain cooling system.
- 29 2. Fill with minimum 50 percent ethylene glycol and water solution.
- 30 3. Assure radiator, engine block and related items protected to minus 50 DegF.
- 31 4. Coolant drain piped to edge of skid with valve or cap.
- 32 C. Jacket Water Heaters: Furnish one or more engine mounted thermal circulation type water
- 33 heaters to maintain engine jacket water at 70 DegF at minimum ambient temperature specified.
- 34 1. Include integral thermostatic controls to maintain desired temperatures.
- 35 2. Rate heaters for 240 V, 1 PH, 60 HZ.

36 2.6 EXHAUST SYSTEM

- 37 A. Exhaust Silencer. Provide a Critical-grade silencer and related hardware to include side inlet,
- 38 standard 125-150 LB flange connections, companion-flanges, cleanouts, Type E support
- 39 arrangement, and stainless steel bellows type flexible exhaust connectors at least 24 IN long.
- 40 1. Ensure silencers and related hardware are properly sized and installed according to the
- 41 manufacturer's recommendation.
- 42 2. The silencer shall be mounted horizontally such that its weight is NOT supported by the
- 43 engine.
- 44 3. Furnish and install exhaust pipe constructed of schedule 40 steel pipe with standard 125-150
- 45 LB flange connections as shown on the Drawings. Exhaust pipe size shall be sufficient to
- 46 ensure that measured exhaust back pressure does not exceed 20 IN of water.
- 47 B. Provide insulation of the exhaust system.
- 48 C. Install insulation so that it does not interfere with the functioning of the flexible exhaust fitting.

49 2.7 STARTING SYSTEMS

UC-40

- 1 A. Starting Motors: Provide 12/24 V DC starting system with solenoid operated positive
- 2 engagement drive.
- 3 B. Batteries: Furnish nickel cadmium batteries with each engine generator with sufficient capacity
- 4 to crank engines for three 20-second cranking periods with a 30-second rest period between
- 5 cranks without recharging.
- 6 1. Provide battery rack appropriately sized for the batteries furnished, painted with alkaline-
- 7 resistant paint.
- 8 2. Provide battery charging alternator with solid state voltage regulator.

9 2.8 CONTROLS

- 10 A. Control Panel:
- 11 1. Provide NEMA 1 enclosed control panel mounted on each generator terminal box with
- 12 vibration isolators.
- 13 2. Construct dead front panel with 14 GA steel.
- 14 3. Include the following devices in panel:
- 15 a. Engine coolant temperature gage.
- 16 b. Engine lube oil pressure gage.
- 17 c. Engine lube oil temperature gage.
- 18 d. Engine running hourmeter.
- 19 e. Battery charging indicators.
- 20 f. Voltmeter (supplied by 3 PT's with 120 V secondary).
- 21 g. Ammeter with true RMS output, supplied by 3 CT's at generator output leads.
- 22 h. Ammeter and voltmeter phase selector switch or switches.
- 23 i. Frequency meter.
- 24 j. Manual and automatic starting controls.
- 25 k. Panel illumination lights and switch.
- 26 l. Voltage level adjustment rheostat.
- 27 m. Fault indicators including low oil pressure, high water temperature, overspeed and
- 28 overcrank. Provide dry contacts for common annunciation of fault conditions.
- 29 n. Surge suppressors for protection of solid state components.
- 30 4. Provide minimum 3-1/2 IN DIA, dial type meters. Accuracy shall be within ± 2 percent.

31 2.9 AUTOMATIC TRANSFER SWITCH

- 32 A. Provide electromechanical automatic transfer switch for the engine-generator set. Switch is to
- 33 be rated for 3 PH, 60 HZ, 480 V operation with continuous current rating as shown on
- 34 Drawings. Switch is to be three pole in NEMA 4X stainless steel wall mounted outdoor
- 35 enclosure. Transfer switch will be mounted remote from generator.
- 36 B. Ensure automatic transfer switch is mechanically held and electrically operated by a single-
- 37 solenoid mechanism energized from the source to which the load is to be transferred.
- 38 C. Provide switch rated for continuous duty and be inherently double throw. The switches are to be
- 39 mechanically interlocked to ensure only one of two possible positions – normal or emergency.
- 40 The automatic transfer switches are to be suitable for use with an engine generator source.
- 41 D. All main contacts are to be of silver surfaced, segmental type: withstand rating equal to main
- 42 switchboard rating. They are to be protected by arcing contacts and are to be of the blow-on
- 43 configuration. The operating transfer time in either direction is not to exceed 1/6 of a second, 10
- 44 cycles.
- 45 E. All contacts, coils, springs and control elements are to be conveniently removable from the front
- 46 of the transfer switch without major disassembly or disconnection of power conductors.
- 47 F. Provide following accessories with each switch:
- 48 1. Time delay – nominal 1 to 10 seconds (adjustable) before starting engine-generator on
- 49 failure of normal power.

UC-41

- 1 2. Time delay – nominal 0-30 seconds (adjustable) on transfer to emergency after unit starts.
- 2 3. Time delay – adjustable 1 to 5 minutes on retransfer to normal with 5 minutes unloaded
- 3 running time of engine-generator after retransfer.
- 4 4. Voltage and frequency lockout relay.
- 5 5. Differential protection 3 PH dropout at 70 percent and pickup at 90 percent voltage.
- 6 6. Engine starting contact.
- 7 7. Four auxiliary contacts: Two close on emergency, two close on normal.
- 8 8. In-phase monitor for retransfer to normal from emergency operation.
- 9 9. Plant exerciser to test the engine generator with load and without load.
- 10 10. Test switch for simulating normal source outage.

11 G. Minimum 3 PH five-cycle fault current withstand ratings shall be:

12 SWITCH SIZE	13 FAULT
14 (AMPERES)	15 CURRENT (AMPERES)
16 Up to 100	22,000
17 Up to 400	42,000
18 Up to 1200	65,000

19 H. All necessary control connections, including starting connections, between transfer switches and generator control panels are to be provided as part of this specification.

20 I. Install circuits in accordance with applicable provisions of Division 16 of these Specifications.

21 2.10 SPARE PARTS

22 A. Furnish Owner the following extra parts and supplies for each generator set:

- 23 1. One complete set of belts.
- 24 2. Two sets of filters, i.e., fuel, oil, and air.
- 25 3. Oil for one complete oil change.
- 26 4. One complete set of control panel indicating lights.
- 27 5. One complete set of gaskets (for complete overhaul).
- 28 6. Complete replacement set of all fuses.

29 B. Spare parts shall be suitably packaged with labels indicating contents of each package.

30 2.11 FUEL TANK

31 A. Provide fuel tank for each generator set, pad mounted, between rails of maximum capacity for space available but not restricting conduit entrance. Minimum 24 hour supply at full rated load.

32 B. Provide low fuel level alarm switch on fuel tank to give contact closure on less than 2 hour fuel supply at rated load.

33 C. Fuel fill connection to be brought outside of enclosure and arranged for full insertion of fuel delivery nozzle without splashing during filling.

34 D. Fuel tank vent to be brought outside of enclosure and designed to prevent intake of rain or insects.

35 E. Provide one (1) full tank of operating fuel for each supplied generator set.

36 2.12 ENGINE GENERATOR ENCLOSURE

37 A. Enclosure shall be weathertight (equal to NEMA 3R) self-contained, engine and generator containment. The enclosure shall have the following features:

- 38 1. Exterior shall be mill prepainted in color selected by Engineer.
- 39 2. Resist intake of rain through intake air assembly.

UC-42

3. Coordinate the enclosure with the engine generator furnished to assure physical clearances, air flow and pressure drop through the system.
4. Provide doors on all sides or hinged air intake louver assembly for removal of large assemblies and maintenance of unit.
5. Provide 120/240 volt, 1 PH, 60 Hz electrical panel for serving loads inside enclosure to include, but not be limited to engine block heaters, battery chargers, lights, receptacles, etc. See Section 16150 for panelboard construction requirements.
6. Provision for exit of exhaust stack in roof, flashed and sealed to prevent entry of moisture. Support for critical silencer on roof.
7. Construction:
 - a. Aluminum or steel frame and exterior panels.
 - b. Structurally stable in 100 mph wind.
 - c. Support roof load of 40 LB per square foot.

2.13 FIELD QUALITY CONTROL

- A. The equipment manufacturer's field service representative(s) shall be provided after delivery to:
 1. Inspect equipment covered by these Specifications.
 2. Conduct initial start up of equipment and perform operational checks at jobsite. Conduct field tests as specified.
 3. Provide instruction to Owner's personnel on training in operation and maintenance of equipment for a 1 day period for each engine generator set.

END OF SECTION

1

2

SECTION 15102

3

PLUG VALVES4 **PART 1 - GENERAL**5 **1.1 SUMMARY**

6 A. Section Includes:

7 1. Plug valves.

8 B. Related Sections include but are not necessarily limited to:

9 1. Division 1 - General Requirements.

10 2. Section 15100 - Valves: Basic Requirements.

11 **1.2 QUALITY ASSURANCE**

12 A. Referenced Standards:

13 1. American National Standards Institute (ANSI):

14 a. A21.11, Rubber - Gasket Joints for Ductile - Iron and Gray - Iron Pressure Pipe and
15 Fittings.

16 b. B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.

17 2. American Society for Testing and Materials (ASTM):

18 a. A126, Gray Iron Castings for Valves, Flanges and Pipe Fittings.

19 **1.3 SUBMITTALS**

20 A. Shop Drawings:

21 1. See Section 15100.

22 B. Operation and Maintenance Manuals:

23 1. See Section 01340.

24 **PART 2 - PRODUCTS**25 **2.1 ACCEPTABLE MANUFACTURERS**26 A. Subject to compliance with the Contract Documents, the manufacturers listed under the specific
27 valve types are acceptable.

28 B. Submit requests for substitution to Engineer.

29 **2.2 NON-LUBRICATED ECCENTRIC PLUG VALVES {(SEWAGE, SLUDGE, SEWAGE GAS
30 APPLICATIONS)}**

31 A. Acceptable Manufacturer:

32 1. DeZurik.

33 2. Keystone.

34 B. Materials:

35 1. Body: Cast-iron ASTM A126, Class B.

36 2. Plug: One piece construction ductile iron, ASTM A536 65-45-12 or cast iron, ASTM 126
37 Class B.38 3. Plug facing: Grease and/or petroleum-resistant resilient Neoprene or Buna-N compound, 70
39 Type A durometer hardness per ASTM D2240.40 4. Shaft bearing bushings: Permanently lubricated TFE or Delrin sleeve type stainless steel or
41 bronze.

UC-44

- 1 5. Valve seats: Welded-in overlay of 90 percent nickel, minimum Brinell hardness of 200,
- 2 (minimum 1/8 IN thick).
- 3 6. Stem seal: Nitrile butadiene packing or Buna-N dual U-cups per Sec. 3.7 AWWA C504.

4 **2.3 ACCESSORIES**

- 5 A. Refer to Section 15100 for actuator requirements.

6 **2.4 DESIGN REQUIREMENTS**

- 7 A. Non-Lubricated Eccentric Plug Valves (Wastewater, Sludge):
- 8 1. Port area:
- 9 a. Valves 4 IN through 20 IN: Equal to or exceed 80 percent of full pipe area.
- 10 b. Valves greater than 20 IN: 100 percent equivalent full pipe area.
- 11 2. Valve body:
- 12 a. Fitted with bolted bonnet.
- 13 3. End connections: See Section 15100.
- 14 4. Stem seal:
- 15 a. Adjustable and replaceable without disassembling valve or bonnet.
- 16 5. Designed for seating drip tight in any flow direction.
- 17 6. Rating:
- 18 a. 1/2 through 12 IN, 175 psi working pressure.
- 19 b. 14 through 36 IN, 150 psi working pressure.
- 20 c. Three-way valves, 125 psi working pressure.
- 21 7. Actuator:
- 22 a. See Section 15100.
- 23 b. Actuator gearing in enclosure suitable for running in oil with seals on shaft to prevent
- 24 entry of dirt or water.
- 25 c. Positive identification on actuator indicating valve position.
- 26 d. Adjustable stop to set closing torque.
- 27 e. Stem seal adjustment accessible without removing actuator from valve.

28 **2.5 FABRICATION**

- 29 A. See Section 15100.

30 **PART 3 - EXECUTION**

31 **3.1 INSTALLATION**

- 32 A. Install valves with valve stem horizontal, plug seat on inlet side and with plug rotating up into
- 33 the open position for valves in horizontal lines.
- 34 B. Install valve with actuator above pipe or plug centerline.

35 **END OF SECTION**

UC-45

1 98C19

2 **SECTION 15106**
3 **CHECK VALVES**

4 **PART 1 - GENERAL**

5 **1.1 SUMMARY**

- 6 A. Section Includes:
7 1. Check valves.
- 8 B. Related Sections include but are not necessarily limited to:
9 1. Division 1 - General Requirements.
10 2. Section 15100 - Valves: Basic Requirements.

11 **1.2 QUALITY ASSURANCE**

- 12 A. Referenced Standards:
13 1. American National Standard Institute (ANSI):
14 a. B16.1, Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.
15 2. American Water Works Association (AWWA):
16 a. C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
17 b. C508, Swing Check Valves for Waterworks Service, 2 through 24 IN NPS.
18 3. Manufacturer's Standardization, Society of the Valve and Fittings Industry, Inc (MSS):
19 a. SP-9, Spot Facing for Bronze, Iron and Steel Flanges.
20 b. SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
21 c. SP-80, Bronze Gate, Globe, Angle and Check Valves.

22 **1.3 SUBMITTALS**

- 23 A. Shop Drawings:
24 1. See Section 15100.
- 25 B. Operation and Maintenance Manuals:
26 1. See Section 01340.

27 **PART 2 - PRODUCTS**

28 **2.1 ACCEPTABLE MANUFACTURERS**

- 29 A. Subject to compliance with the Contract Documents, manufacturers listed under the valve with
30 types are acceptable.
- 31 B. Submit requests for substitution in accordance to Engineer.

32 **2.2 CUSHIONED SWING CHECK VALVE: 2 TO 24 IN**

- 33 A. Class 250.
- 34 B. Comply with AWWA C508.
- 35 C. Acceptable Manufacturers:
36 1. Air:
37 a. Golden Anderson Figure 25D (Class 250).
38 b. APCO Series 6000.
39 c. Or approved equal.
- 40 D. Materials:

UC-46

- 1 1. Body, cover, disc, levers: Cast iron or cast steel.
- 2 2. Seat: Bronze or stainless steel.
- 3 3. Seat ring: Bronze or rubber (Buna-N).
- 4 4. Hinge: Stainless steel.
- 5 5. Cushion cylinder: Metallic corrosion resistant material.
- 6 E. Design Requirements:
- 7 1. Seat ring: Replaceable.
- 8 2. Hinge: Extend out both sides with lever and weight.
- 9 3. Cushion: Air type with adjustable speed control.

10 **PART 3 - EXECUTION**

11 **3.1 INSTALLATION**

- 12 A. Install in accordance with manufacturer's instructions.

13 **END OF SECTION**

14

SECTION 16010**ELECTRICAL: BASIC REQUIREMENTS****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Basic requirements for electrical systems.

1.2 DEFINITIONS**A. Outdoor Areas:**

1. Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.

B. Shop Fabricated:

1. Manufactured or assembled equipment for which a UL test procedure has not been established.

1.3 QUALITY ASSURANCE**A. Referenced Standards:**

1. American National Standards Institute (ANSI):
 - a. C2, National Electrical Safety Code.
2. American Society for Testing and Materials (ASTM):
 - a. A36, Standard Specification for Carbon Structural Steel.
 - b. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - c. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - d. Z535.1, Safety Color Code.
 - e. Z535.2, Environmental and Facility Safety Signs.
 - f. Z535.3, Criteria for Safety Symbols.
 - g. Z535.4, Product Safety Signs and Labels.
3. ETL Testing Laboratories, Inc (ETL).
4. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. ICS 6, Enclosures for Industrial Controls and Systems.
5. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
6. Occupational, Health and Safety Administration (OSHA)
 - a. 1910.145, Specification for Accident Prevention Signs and Tags.
7. Underwriters Laboratories, Inc (UL):
 - a. 508, Safety Industrial Control Equipment.
 - b. 698, Industrial Control Equipment for Use in Hazardous Locations.

1.4 SYSTEM DESCRIPTION

- A. Provide functioning systems in compliance with manufacturer's instructions, performance requirements specified or shown on the Drawings, and modifications resulting from reviewed shop drawings and field coordinated drawings.

1.5 SUBMITTALS

- A. Follow NC DOT process for all submittals

1.6 DELIVERY, STORAGE, AND HANDLING

1 A. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage-either
2 inside or on top of enclosures.

3 B. Protect nameplates on electrical equipment to prevent defacing.

4 **1.7 AREA DESIGNATIONS**

5 A. All equipment supplied for this project will be located outdoors. All equipment enclosures shall
6 be NEMA 4X stainless steel. Mini power zone may be NEMA 3R.

7 **PART 2 - PRODUCTS**

8 **2.1 ACCEPTABLE MANUFACTURERS**

9 A. Refer to related Division 16 sections.

10 B. Provide all equipment of a similar type by one manufacturer unless otherwise noted in the
11 Specifications.

12 C. Trade names and catalog numbers may be used in the Drawings or Specifications to establish
13 quality standards and basics of design.

14 1. Other listed manufacturers in the applicable specification sections with equal equipment
15 may be acceptable.

16 2. If no other manufacturer is listed, then manufacturers of equal equipment may be
17 acceptable.

18 D. Listed:

19 1. Where UL test procedures have been established for the product type, use UL or ETL
20 approved electrical equipment and provide with the UL or ETL label.

21 E. Nameplates, Safety Signs and Markers: See Article 2.2.

22 **2.2 MATERIALS**

23 A. Electrical Equipment Supports:

24 1. Galvanized steel:

25 a. Standard: ASTM A36, ASTM A123 and ASTM A153.

26 2. Stainless steel:

27 a. Standards:

28 1) Stainless steel, AISI Type 316.

29 2) Stainless steel AISI Type 304.

30 3. PVC coated galvanized steel.

31 a. NEMA RN1

32 B. Electrical Equipment Enclosures:

33 1. Standards: NEMA ICS-6, UL 508 and UL 698.

34 C. Nameplates for labeling equipment enclosures and equipment that is visible with the enclosure
35 door closed:

36 1. Approved manufacturers catalog numbers:

37 a. W. H. Brady Co., #B-1.

38 b. Seton, "Setonply".

39 2. Materials: Phenolic, 2-ply engraved.

40 3. Size:

41 a. Surface: As required for the text.

42 b. Thickness: 1/16 IN.

43 4. Fabrication:

44 a. Two layer laminated.

45 b. Legend engraved through top lamination into bottom lamination.

46 c. Drilled holes in each corner, for screw mounting.

UC-49

- 1 5. Lettering:
 - 2 a. 3/8 IN high minimum for switchgear, switchboards, motor control centers, panelboards
 - 3 and transformers.
 - 4 b. 3/16 IN high minimum for all other equipment.
 - 5 6. Colors: Black top surface, white core, unless otherwise indicated.
- 6 D. Nameplates for labeling components inside equipment enclosures:
 - 7 1. Approved manufacturers catalog numbers:
 - 8 a. W. H. Brady Co., "Industrial Strength Tape" #42018.
 - 9 b. Seton, "Component and General Identification Labels" #45553.
 - 10 c. Panduit, "Standard Labeling Tape" LS4-33.
 - 11 2. Materials: vinyl tape or vinyl cloth with printable topcoat.
 - 12 3. Size: 1/2 IN. high, length as required by the text.
 - 13 4. Colors: White background, black printing.
- 14 E. Wire Markers:
 - 15 1. Materials: vinyl or polyester tape.
 - 16 a. Approved manufacturer's catalog numbers:
 - 17 1) W. H. Brady Co., Indoor/Outdoor Vinyl Tape, B-580.
 - 18 2) Seton, "Self-Laminating Wire Marker Labels" M7340.
 - 19 3) Panduit, LS4M "Industrial Labeling Tape".
 - 20 b. Size: Height as required by the wire size, length as required by the text.
 - 21 c. Colors: White background, black printing.
 - 22 2. Materials: Heat shrinkable polyolefin:
 - 23 a. Approved manufacturer's catalog numbers:
 - 24 1) Seton, Welded Wire Marking Sleeves.
 - 25 b. Size: Height as required by the wire size, length as required by the test.
 - 26 c. Colors: White background, black printing.
- 27 F. Safety Signs:
 - 28 1. Approved manufacturers catalog numbers:
 - 29 a. W. H. Brady Co., #B-302 or #B-120.
 - 30 b. Seton, Pressure Sensitive Vinyl or Tedlar Coated Plastic.
 - 31 c. Panduit, GMM Polyester Film (Type PPS) or GMPE1 Rigid Polyethylene (Type PRS).
 - 32 2. Materials, size and fabrication:
 - 33 a. For indoor use: Polyester or vinyl, surface area as required by the text, 4 mil minimum
 - 34 thickness, self-adhesive.
 - 35 b. For outdoor use and on entrances to electrical rooms or stations: Fiberglass or coated
 - 36 plastic, surface area as required by the text, minimum area 7 X 10 IN, 60 mil thickness,
 - 37 drilled holes for screw mounting .
 - 38 3. Color in accordance with ASME (ANSI Z535.1, .2, .3 and .4) and OSHA 1910.145.
 - 39 4. Minimum letter size on indoor signs, 3/16IN.
 - 40 5. Maximize the letter size on outdoor signs to sufficiently fill the printable area on the sign.
 - 41 6. Standards:
 - 42 a. ASME/ANSI Z535.1, Z535.2, Z535.3 and Z535.4.
 - 43 b. OSHA 1910.145.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and wire all equipment, including prepurchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specifications and ensure that equipment is ready and safe for energization.
- B. Install equipment in accordance with the requirements of:
 1. The NEC.

UC-50

- 1 2. The manufacturer's instructions.
- 2 C. Equipment Finishes:
- 3 1. See Section 11005.
- 4 2. Paint interiors of control panels white or light gray.
- 5 D. Do not use equipment that exceed dimensions or reduce clearances indicated on the Drawings or
- 6 as required by the NEC.
- 7 E. Coordinate the installation of electrical equipment with other trades.
- 8 1. Arrange for the building in of equipment during structure construction.
- 9 2. Where equipment cannot be built-in during construction, arrange for sleeves, box-outs,
- 10 openings, etc., as required to allow installation of equipment after structure construction is
- 11 complete.
- 12 F. Install equipment plumbed, square and true with construction features and securely fastened.
- 13 G. Install electrical equipment, including pull and junction boxes, minimum of 6 IN from process,
- 14 gas, air and water piping and equipment.
- 15 H. Install equipment so it is readily accessible for operation and maintenance, is not blocked or
- 16 concealed and does not interfere with normal operating and maintenance requirements of other
- 17 equipment, complying with National Electrical Code required clearances.
- 18 I. Device Mounting Schedule:
- 19 1. Mounting heights as indicated below:
- 20 a. Light switch (to center): 48 IN.
- 21 b. Receptacle in all locations (to bottom): 48 IN.
- 22 c. Panelboard (to top): 72 IN.
- 23 d. Motor starter (to center of operating handle): 54 IN.
- 24 e. Pushbutton motor control station (to center): 48 IN.
- 25 J. Avoid interference of electrical equipment operation and maintenance with structural members,
- 26 building features and equipment of other trades. When it is necessary to adjust the intended
- 27 location of electrical equipment, unless specifically dimensioned or detailed, the Contractor may
- 28 make adjustments in equipment locations in accordance with the following without obtaining the
- 29 Engineer's approval:
- 30 1. 1 FT at grade, floor and roof level in any direction in the horizontal plane.
- 31 2. 1 FT for equipment other than lighting at ceiling level in any direction in the horizontal
- 32 plane.
- 33 3. 1 FT for lighting fixtures at ceiling level in any direction in the horizontal plane.
- 34 4. 1 FT on walls in a horizontal direction within the vertical plane.
- 35 5. Changes in equipment location exceeding those defined above require the Engineer's
- 36 approval.
- 37 K. Electrical Equipment Supports: (Strut Material)
- 38 1. Unless otherwise noted on the Drawings or in the detailed specifications use:
- 39 a. Type 304 stainless steel in wet, corrosive areas.
- 40 1) Type 316 stainless steel or PVC-coated galvanized steel may also be used in these
- 41 areas.
- 42 b. Galvanized steel in dry areas.
- 43 L. Provide all necessary anchoring devices and supports as detailed on the Drawings and rated for
- 44 the equipment load based on dimensions and weights verified from approved submittals, or as
- 45 recommended by the manufacturer.
- 46 1. Do not cut, or weld to, building structural members.
- 47 2. Do not mount safety switches or other equipment to equipment enclosures, unless enclosure
- 48 mounting surface is properly braced to accept mounting of external equipment.
- 49 M. Electrical Equipment Enclosures:

UC-51

1. All enclosures for this project shall be NEMA 4X except generator enclosure. Transformer enclosures may be NEMA 3R.
- N. Provide corrosion resistant spacers to maintain ¼ IN separation between equipment and mounting surface in Wet areas, on below grade walls and on walls of liquid containment or processing areas.
- O. Install floor-mounted equipment on concrete pads or foundations.
- P. Do not place equipment fabricated from aluminum in direct contact with earth or concrete.
- Q. Screen or seal all openings into equipment mounted outdoors to prevent the entrance of rodents and insects.
- R. All conduits run into wet well shall have conduit seal installed outside wet well to prevent gas from migrating to control panels in accordance with Article 501 of the National Electrical Code.
- S. Do not use materials that may cause the walls or roof of a building to discolor or rust.
- T. Tag equipment enclosures and components that are visible with the enclosure door closed in accordance with the following:
 1. All equipment including, but not limited to, transformers, panelboards, motor starters, circuit breakers, safety switches, and control panels.
 2. Legend: Name and number of enclosure or device as indicated on the Drawings such as LP-101 and P-206.
- U. Tag components inside equipment enclosures in accordance with the following:
 1. All components including, but not limited to, circuit breakers, fuses, control power transformers, relays, contactors, and timers.
 2. Legend: Function of equipment such as M-101, CR-101 and TR-101.
- V. Tag wires with wire markers in control panels and in pull or junction boxes, handholes and manholes where multiple circuits exist
 1. Tag wire at both ends and in junction and pull boxes, handholes and manholes.
 2. Legend: Circuit number or wire number as shown on the Drawings or as furnished with the equipment.
- W. Install Safety Signs as indicated in the following:
 1. Legend in accordance with the following tabulation:
 - a. Equipment such as motor control centers, control panels, etc., where more than one source may be present in an enclosure or cubicle: In accordance with OSHA Danger Sign requirements, VOLTAGE (define voltage, example 120 VAC control voltage or 480 VAC power) FROM MULTIPLE SOURCES IN THIS ENCLOSURE.
 - b. Equipment such as panelboards and motor starters: In accordance with OSHA Warning Sign requirements, WARNING, SERVICE ENTRANCE DISCONNECT.
- X. Field paint in accordance with Section 09905.

3.2 FIELD QUALITY CONTROL

- A. Verify exact rough-in location and dimensions for connection to electrical items furnished by Others.
 1. Secure shop drawings from those furnishing the equipment.
 2. Provide sleeves wherever openings are required through new concrete or masonry members.
 3. Place sleeves accurately and coordinate locations with the Engineer.
 4. Should any cutting and patching be required due to failure to coordinate penetrations, such cutting and patching shall be done at the expense of the Contractor.
 5. Contractor shall not endanger the stability of any structural member by cutting, digging, chasing, or drilling and shall not, at any time, cut or alter the work without the Engineer's written consent.
 - a. Provide additional reinforcing if required.

UC-52

- 1 6. Use workmen skilled in their particular field for subsequent patching to restore walls,
2 ceilings, or floors to their original condition.
- 3 B. Testing:
- 4 1. After installation test all equipment as recommended by the manufacturer and verify all
5 components are operational.
- 6 2. Continuity test all system and equipment grounding.
- 7 3. Performance test in accordance with the manufacturer's instructions all main and feeder
8 circuit breakers provided with ground-fault protection. Test immediately after installation
9 per NEC Article 230.
- 10 4. Test Equipment Interface and verify protection, coordination and operation.
- 11 5. Adjust installed equipment for proper operation of all electrical and mechanical
12 components.
- 13 C. Replace equipment and systems found inoperative or defective and re-test.
- 14 D. Cleaning:
- 15 1. Apply touch-up paint as required to repair scratches and other marks.
- 16 2. Replace nameplates damaged during installation.
- 17 3. Thoroughly vacuum the interior of all enclosures to remove dirt and debris.

3.3 DEMONSTRATION

- A. Demonstrate equipment to satisfaction of Engineer.

END OF SECTION

1 **SECTION 16060**
2 **GROUNDING**

3 **PART 1 - GENERAL**

4 **1.1 SUMMARY**

- 5 A. Section Includes:
6 1. Grounding.

7 **1.2 QUALITY ASSURANCE**

- 8 A. Assure ground continuity is continuous throughout the entire Project.
9 B. Referenced Standards:
10 1. American Society for Testing and Materials (ASTM):
11 a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard,
12 Medium-Hard, or Soft.
13 2. Institute of Electrical and Electronics Engineers (IEEE):
14 a. 837, Qualifying Permanent Connections Used in Substation Grounding.
15 3. National Fire Protection Association (NFPA):
16 a. 70, National Electric Code (NEC).
17 4. Underwriters Laboratories, Inc. (UL):
18 a. 467, Electrical Grounding and Bonding Equipment.

19 **1.3 SUBMITTALS**

- 20 A. Follow NC DOT process for all submittals

21 **PART 2 - PRODUCTS**

22 **2.1 ACCEPTABLE MANUFACTURERS**

- 23 A. Subject to compliance with the Contract Documents, the following manufacturers are
24 acceptable:
25 1. Ground rods and bars and grounding clamps, connectors and terminals:
26 a. Burndy.
27 b. Harger Lightning Protection
28 c. Heary Brothers.
29 d. Joslyn.
30 e. Robbins Lightning Protection.
31 f. Thompson.
32 2. Exothermic weld connections:
33 a. Burndy.
34 b. Erico Products Inc., Cadweld.
35 c. Harger Lightning Protection
36 3. Prefabricated composite test stations:
37 a. Quazite Composolite.
38 b. Armorcast Products Company.
39 c. Or equal.
40 4. Fall-of-potential test device:
41 a. "Ground Megger" device: James G. Biddle Co.
42 B. Submit requests for substitution to Engineer.
43

2.2 COMPONENTS

- A. Wire and Cable:
 - 1. Bare conductors: Soft drawn stranded copper meeting ASTM B8.
 - 2. Insulated conductors: Green colored insulation, per Section 16120.
- B. Conduit: As specified in Section 16131.
- C. Ground Rods:
 - 1. 3/4 IN x 10 FT, or as indicated on the Drawings.
 - 2. Copperclad:
 - a. Heavy uniform coating of electrolytic copper molecularly bonded to a rigid steel core.
 - b. Corrosion resistant bond between the copper and steel.
 - c. Hard drawn for a scar-resistant surface.
- D. Grounding Clamps, Connectors and Terminals:
 - 1. Mechanical type:
 - a. Standards: UL 467.
 - b. High copper alloy content.
 - 2. Compression type:
 - a. Standards: UL 467, IEEE 837.
 - b. High copper alloy content.
 - c. Suitable for direct burial in earth or concrete.
- E. Exothermic Weld Connections:
 - 1. Copper oxide reduction by aluminum process.
 - 2. Molds properly sized for each application.
- F. Prefabricated Composite Material Test Stations – Not Used -

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. General:
 - 1. Install products in accordance with manufacturer's instructions.
 - 2. Size conductors as required by NEC 250, except use larger size conductors where indicated on the Drawings.
 - 3. Remove paint, rust, or other nonconducting material from contact surfaces before making ground connections.
 - 4. Where ground conductors pass through floor slabs or building walls provide sleeves per Section 16131.
 - 5. Do not splice grounding conductors except at ground rods, using approved, listed connectors.
 - 6. Install ground rods and grounding conductors in firm soil outside of areas excavated during construction of the structure.
 - a. Provide excavation required for installation of ground rods and ground conductors.
 - b. Use driving studs or other suitable means to prevent damage to threaded ends of sectional rods.
 - c. Provide sufficient slack in grounding conductor to prevent conductor breakage during backfill or due to ground movement.
 - d. Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
 - 7. Do not use exothermic welding if it will damage the structure the grounding conductor is being welded to.
- B. Grounding Electrode System:
 - 1. Provide a grounding electrode system in accordance with NEC 250.

UC-55

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2. Ground Ring Grounding System:
 - a. Ground ring consists of ground rods and a grounding conductor looped around the structure.
 - b. Placed at a minimum of 10 FT from the structure foundation and 2 FT-6 IN below grade.
 - c. Provide a minimum of four ground rods placed at the corners of the structure and additional rods so that the maximum distance between ground rods does not exceed 50 FT.
 - d. Structural Grounding:
 - 1) Bond metal support columns to the ground ring at all corners of the structure.
 - 2) Bond alternate metal support columns along the perimeter of the structure to the ground ring.
 - 3) Bond interior metal support columns as indicated on the Drawings.
 - e. Grounding conductor:
 - 1) Bare #4/0 AWG conductor.
 - 2) Grounding conductor connected to the ground rods and metal support columns with compression type connector or exothermic weld.
 - f. Ground rod test stations:
 - 1) Provide where indicated on the Drawings.
 - 2) Grounding conductors connected to ground rod with removable ground clamps.
 - C. Supplemental Grounding Electrode:
 1. Provide the following grounding in addition to the equipment ground conductor supplied with the feeder conductors.
 2. Metal light poles:
 - a. Connect metal pole and pole base reinforcing steel to a ground rod.
 - b. Grounding conductor: {Bare #6 AWG conductor.} {Bare conductor, size as indicated on the Drawings.}
 3. Motors 100 HP and larger:
 - a. Provide a bare #2/0 AWG conductor bolted to the motor frame and connected to the ground ring.
 4. Generators.
 - a. Provide bare #2/0 AWG conductor bolted to the generator frame and connected to the ground ring.
 - D. Bonding of Miscellaneous Structures:
 1. Other metal piping:
 - a. Connect in a daisy chain or radial fashion: process piping to the main ground bus:
 - b. Bare #2/0 AWG conductor.
 - c. Grounding conductor connected to the pipes with mechanical type connectors.
 2. Structural steel:
 - a. Bare #2/0 AWG conductor.
 - b. Grounding conductor connected to the steel with compression type connector or exothermic weld.
 - E. Raceway Grounding:
 1. All metallic conduit shall be electrically continuous.
 2. All power raceways shall contain an equipment grounding conductor.
 3. Conductor insulation shall be identical to phase conductors.
 4. Provide grounding-type insulating bushings:
 - a. For all equipment not supplied with a conduit hub.
 - b. On ends of metallic ductbank conduit.
 5. Provide double locknuts at all panels.
 6. Bond all conduit, at entrance and exit of equipment, to the equipment ground bus or lug.
 7. Provide bonding jumpers if conduits are installed in concentric knockouts.

UC-56

- 1 8. Make all metallic raceway fittings and grounding clamps tight to ensure equipment
- 2 grounding system will operate continuously at ground potential to provide low impedance
- 3 current path for proper operation of overcurrent devices during possible ground fault
- 4 conditions.
- 5 9. Provide bonding jumpers identical in conductor size to the largest ground conductor run
- 6 within the conduit.
- 7 F. Equipment Grounding:
- 8 1. Ground all equipment supplied from electrical gear through the gear's equipment ground
- 9 bus. Provide an equipment grounding conductor connected to the ground bus and equipment
- 10 ground lug.
- 11 2. Bond control devices (switches, indicating lights, meters, starters, relays, etc.) mounted in
- 12 starters, control panels, or other metal enclosures in accordance with the National Electrical
- 13 Code.
- 14 3. Ground unused and spare power and control cable at both ends.

3.2 FIELD QUALITY CONTROL

- A. Leave grounding system uncovered until inspected by Engineer.
- B. Complete grounding system: Resistance of 5 ohms or less.
- C. Test resistance of installed ground system after backfilling and before connection to any other grounded system including underground piping, utility services or other building ground systems.
 1. Test ground grid resistance by fall-of-potential method.
 2. Perform test at the ground rod test station.

END OF SECTION

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2

SECTION 16120

3

WIRE AND CABLE - 600 VOLT AND BELOW

4

PART 1 - GENERAL

5

1.1 SUMMARY

6

A. Section Includes:

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1. Building wire and cable (600 V and below), instrumentation cable, splices, taps, electrical tape and pulling lubricant.

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9

1.2 QUALITY ASSURANCE

10

A. Referenced Standards:

11

1. Insulated Cable Engineers Association/National Electrical Manufacturers Association (ICEA/NEMA):

12

13

- a. S-66-524/WC 7, Cross-Linked Thermosetting- Polyethylene-Insulated Wire and Cable for Transmission and Distribution of Electrical Energy.

14

15

2. National Fire Protection Association (NFPA):

16

- a. 70, National Electrical Code (NEC).

17

3. Underwriters Laboratories, Inc (UL):

18

- a. 44, Rubber Insulated Wires and Cables.

19

- b. 486A, Wire Connectors and Soldering Lugs for use with Copper Conductors.

20

- c. 486B, Wire Connectors for use with Aluminum Conductors.

21

- d. 510, Insulating Tape.

22

- e. 1449, Safety Transient Voltage Surge Suppressors.

23

1.3 DEFINITIONS

24

A. Cable: Multi-conductor, insulated, with outer sheath.

25

1. May contain either building wire or instrumentation wire.

26

B. Instrumentation Cable: Multiple conductors, insulated, twisted with outer sheath, intended for transmission and distribution of low current (4-20 mA DC) or low voltage (0-10 V DC) analog signals, No. 16 AWG and smaller. Commonly used types are defined in the following:

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29

1. TP: Twisted pair without shield.

30

2. TSP: Twisted-shielded pair.

31

3. TST: Twisted-shielded triad.

32

C. Power Cable: Containing multi-conductor insulated building wire, No. 12 AWG and larger.

33

D. Control Cable: Containing multi-conductor insulated control wires, No. 16, No. 14 or No. 12 AWG.

34

35

E. Wire: Single conductor, insulated, with or without outer jacket depending upon type.

36

1.4 SUBMITTALS

37

A. Follow NC DOT process for all submittals.

38

PART 2 - PRODUCTS

39

2.1 MANUFACTURED UNITS

40

A. Building wire, power and control cable:

41

1. All conductors shall be copper.

UC-58

- 1 2. Subject to compliance with Contract Documents, the following manufacturers are
- 2 acceptable:
- 3 a. American Insulated Wire Corporation.
- 4 b. Cablec Corporation.
- 5 c. Carol Cable Company, Inc.
- 6 d. Rome Cable Corporation.
- 7 e. Southwire Company.
- 8 3. Conform to ICEA/NEMA S-66-524/WC 7 and UL 44 for type XHHW insulation.
- 9 B. Instrumentation Cable:
- 10 1. Subject to compliance with Contract Documents, the following manufacturers are
- 11 acceptable:
- 12 a. Alpha Wire Corporation.
- 13 b. American Insulated Wire Corporation.
- 14 c. Belden Wire and Cable.
- 15 d. Carol Cable Company.
- 16 2. Conform to UL 444, Communications Cable, NEC type CMP, tinned copper conductors,
- 17 100 percent shield coverage. Teflon insulated with Teflon jacket.
- 18 C. Building wire, power cable, control cable and instrumentation cable:
- 19 1. UL listed or UL recognized.
- 20 2. Surface mark with manufacturers name or trademark, conductor size, insulation type and
- 21 UL label.
- 22 D. Splices and Taps:
- 23 1. Subject to compliance with Contract Documents, the following manufacturers are
- 24 acceptable:
- 25 a. Burndy Corporation.
- 26 b. Ideal.
- 27 c. Minnesota Mining and Manufacturing Co.
- 28 d. Penn Union.
- 29 e. Thomas and Betts.
- 30 2. UL listed.
- 31 3. Conform to UL 486A.
- 32 E. Electrical Tape:
- 33 1. Pressure sensitive vinyl.
- 34 2. Premium grade.
- 35 3. Heat, cold, moisture, and sunlight resistant.
- 36 4. UL listed.
- 37 5. Thickness, depending on use conditions: 7, 8.5, or 10 mil.
- 38 6. For cold weather or outdoor location, tape must also be all-weather.
- 39 7. Comply with UL 510.
- 40 F. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products
- 41 which will deteriorate insulation.
- 42 G. Submit requests for substitutions to Engineer.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Usage of Insulation Types:
 1. Type THHN/ THWN/ MTW insulated conductors shall be used for all wire, power and control cable applications.
- B. Conductor size limitations:

UC-59

- 1 1. Power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the
- 2 Drawings.
- 3 2. Control conductors shall not be smaller than No. 14 AWG unless otherwise indicated on the
- 4 Drawings.
- 5 3. Instrumentation conductors shall not be smaller than No. 18 AWG unless otherwise
- 6 indicated on the Drawings.

- 7 C. Color code all wiring as follows:
- 8 1. Lighting and power wiring:
- 9

	120/208 V	480 V
Phase 1	Black	Brown
Phase 2	Red	Orange
Phase 3	Blue	Yellow
Neutrals	White	White
Ground	Green	Green

- 10
- 11 2. Color code ends of feeder phase conductors only.
- 12 D. Install all wiring in raceway unless otherwise indicated on the Drawings.
- 13 E. Feeder, branch, control and instrumentation circuits shall not be combined in conduit, wireway,
- 14 junction or pull boxes; except as permitted in the following:
- 15 1. Where specifically indicated on the Drawings or field conditions dictate and written
- 16 permission is obtained from the Engineer.
- 17 a. Feeder and branch circuits shall be isolated from each other and from all control and
- 18 instrumentation circuits.
- 19 b. Control circuits shall be isolated from feeder, branch and instrumentation circuits.
- 20 1) Where combining of control circuits is permitted the combinations shall comply
- 21 with the following:
- 22 a) 12 VDC, 24 VDC and 48 VDC may utilize a common raceway.
- 23 2) 125 VDC shall be isolated from all other AC and DC circuits.
- 24 3) AC control circuits shall be isolated from all DC circuits.
- 25 c. Instrumentation circuits shall be isolated from feeder, branch and control circuits.
- 26 1) Certain instrumentation equipment are "two-wire" devices which accept a 24 VDC
- 27 input and produce a 4-20 mA DC output. This wiring shall be in a common
- 28 raceway.
- 29 2) Where combining of instrumentation circuits is permitted the combinations shall
- 30 comply with the following:
- 31 a) 4-20 mA DC and 0-10 VDC analog signal circuits may utilize a common
- 32 raceway.
- 33 2. For lighting circuits, multiple branch circuits may be installed in a raceway as allowed by
- 34 the NEC, with the wire ampacity derated in accordance with the requirements of the NEC.
- 35 Raceway fill shall not exceed the limits established by the NEC.
- 36 F. Ground the drain wire of shielded cables at one end only.
- 37 1. The preferred grounding location is at the load, not at the source.
- 38 G. Maintain electrical continuity of the shield when splicing twisted shielded conductors.
- 39 H. Make splices and taps only at pull or junction boxes.
- 40 1. Crimp or indenter-type connectors: Installation shall be made using a ratchet type
- 41 compression tool.
- 42 2. Insulated conical spring type connectors may be used for wire smaller than #6 AWG.
- 43 3. Solderless lugs and screw type connectors may be used for #6 AWG and larger wire.
- 44 I. Electrical Tape Usage:
- 45 1. For insulating connections of #8 AWG wire and smaller: 7 mil vinyl tape.
- 46 2. For insulating splices and taps of #6 AWG wire or larger: 10 mil vinyl tape.

UC-60

- 1 3. For insulating connections made in cold weather or in outdoor locations: 8.5 mil, all weather
- 2 vinyl tape.
- 3 J. Terminate instrumentation and control wiring, including spare wires, at control panels and motor
- 4 control centers on terminal boards mounted inside the equipment.
- 5 1. Contractor shall supply terminal boards as required.
- 6 2. Do not field wire directly to devices.
- 7 3. Ground both ends of spare wires. Spare wires will be labeled on each end.

8 **END OF SECTION**

UC-61

SECTION 16131 RACEWAYS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduits.
2. Conduit fittings.
3. Conduit supports.
4. Wireways

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American National Standards Institute (ANSI):
 - a. C80.1, Rigid Steel Conduit - Zinc-Coated.
2. American Society for Testing and Materials (ASTM):
 - a. A123, Standard Specification for. Zinc Coating (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - b. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - c. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
 - d. D2564, Solvent Cements for (PVC) Plastic Pipe, Tubing, and Fittings.
 - e. E84, Standard Test Method for Surface Burning Characteristics of Building Materials/
 - f. (ANSI/ASTM) F512, Standard Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.
3. ETL Testing Laboratories, Inc (ETL).
4. National Electrical Manufacturers Association (NEMA):
 - a. RN1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - b. TC-2, Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
 - c. TC-3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
 - d. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
5. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
6. Underwriters Laboratories Inc (UL):
 - a. 1, Flexible Metal Conduit.
 - b. 6, Rigid Metal Conduit.
 - c. 94, Test for Flammability of Plastic Materials for Parts in Devices and Appliances.
 - d. 360, Liquid-Tight Flexible Steel Conduit.
 - e. 467, Grounding and Bonding Equipment.
 - f. 514B, Fittings for Cable and Conduit.
 - g. 651, Schedule 40 and 80 Rigid PVC Conduit.
 - h. 797, Safety Electrical Metallic Tubing.
 - i. 870, Wireways, Auxiliary Gutters, and Associated Fittings.

1.3 SUBMITTALS

- A. Follow NC DOT process for all submittals

1.4 DELIVERY, STORAGE, AND HANDLING

- A. See Section 16010.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable.

1. Rigid metallic conduits.
 - a. Allied Tube and Conduit Corporation.
 - b. Triangle PWC Inc.
 - c. Western Tube and Conduit Corporation.
 - d. Wheatland Tube Company.
 - e. LTV Steel Company.
2. PVC coated rigid metallic conduits and repair kits.
 - a. Occidental Coating Company.
 - b. Perma-Cote.
 - c. Rob-Roy Ind.
 - d. Raychem "GelTek" tape.
3. Rigid non-metallic conduit.
 - a. Carlon.
 - b. Certainteed Corporation.
 - c. Canadian General Electric Company.
 - d. Western Plastics Corporation.
4. Flexible conduit.
 - a. Anamet, Inc.
 - b. International Metal Hose Company.
 - c. Flexible Metal Hose Company.
 - d. Triangle PWC Inc.
 - e. LTV Steel Company.
5. Wireway.
 - a. Hoffman Engineering Company.
 - b. Wiegmann.
 - c. Square D.
6. Conduit Fittings and accessories.
 - a. Appleton.
 - b. Carlon.
 - c. Crouse-Hinds.
 - d. Killark.
 - e. OZ Gedney Company.
 - f. RACO.
 - g. Steel City.
 - h. Thomas and Betts.
 - i. Western Plastics Company.
 - j. Or equal.
7. Conduit support systems.
 - a. Unistrut Building Systems.
 - b. B-Line Systems Inc.
 - c. Kindorf.
 - d. Minerallac Fastening Systems.
 - e. Caddy.
 - f. Or equal.

B. Substitution: Submit requests for substitution to Engineer.

2.2 RIGID METALLIC CONDUITS

- A. Rigid galvanized steel conduit (RGS):
1. Mild steel with continuous welded seam.

UC-63

- 1 2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing. Threads galvanized
- 2 after cutting.
- 3 3. Internal Coating: Baked lacquer, varnish or enamel for a smooth surface.
- 4 4. Standards: ANSI C80.1, UL 6.
- 5 B. PVC-Coated rigid steel conduit (PVC-RGS):
- 6 1. Nominal 40 mil Polyvinyl Chloride Exterior Coating:
- 7 a. Coating: Bonded to hot-dipped galvanized rigid steel conduit conforming to ANSI
- 8 C80.1.
- 9 b. The bond between the PVC coating and the conduit surface: Greater than the tensile
- 10 strength of the coating.
- 11 2. Nominal 2 mil, minimum, urethane interior coating.
- 12 3. Urethane coating on threads.
- 13 4. Conduit: Epoxy prime coated prior to application of PVC and urethane coatings.
- 14 5. Female Ends: Have a plastic sleeve extending a minimum of 1 pipe diameter or 2 IN,
- 15 whichever is less beyond the opening. The inside diameter of the sleeve shall be the same as
- 16 the outside diameter of the conduit to be used with it.
- 17 6. Standards: ANSI C80.1, UL 6, NEMA RN-1.

2.3 RIGID NON-METALLIC CONDUIT

- 19 A. Schedules 80 (PVC-80):
- 20 1. Polyvinyl-chloride (PVC) plastic compound which meets, as a minimum, ASTM D1784 cell
- 21 classification PVC 12233-A, B, or C.
- 22 2. Rated for direct sunlight exposure.
- 23 3. Fire retardant and low smoke emission.
- 24 4. Shall be suitable for use with 90 DegC wire and shall be marked "maximum 90 DegC".
- 25 5. Standards: ASTM D1784, NEMA TC-2, UL 651.

2.4 FLEXIBLE CONDUIT

- 27 A. PVC-Coated flexible galvanized steel (liquid-tight) conduit (FLEX-LT):
- 28 1. Core formed of continuous, spiral wound, hot-dip galvanized steel strip with successive
- 29 convolutions securely interlocked.
- 30 2. Extruded PVC outer jacket positively locked to the steel core.
- 31 3. Liquid and vaportight.
- 32 4. Standard: UL 360.

2.5 WIREWAY

- 34 A. General.
- 35 1. Suitable for lay-in conductors.
- 36 2. Designed for continuous grounding.
- 37 3. Covers:
- 38 a. Hinged or removable in accessible areas.
- 39 b. Non-removable when passing through partitions
- 40 4. Finish: Rust inhibiting primer and manufacturers standard paint inside and out except for
- 41 stainless steel type.
- 42 5. Standards: UL 870, NEMA 250.
- 43 B. Watertight (NEMA 4X rated) Wireway:
- 44 1. 14 gage Type 304 or 316 stainless steel bodies and covers with out knockouts and 10 gage
- 45 stainless steel flanges.
- 46 2. Cover: Fully gasketed and held in place with captive clamp type latches.
- 47 3. Flanges: Fully gasketed and bolted.

2.6 CONDUIT FITTINGS AND ACCESSORIES

- 49 A. Fittings for use with RGS:
- 50 1. In hazardous locations listed for use in Class I, Groups C and D locations.

UC-64

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2. Locknuts:
 - a. Threaded steel or malleable iron.
 - b. Gasketed or nongasketed.
 - c. Grounding or non-grounding type.
 3. Bushings:
 - a. Threaded, insulated metallic.
 - b. Grounding or non-grounding type.
 4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.
 5. Couplings:
 - a. Threaded straight type: Same material and finish as the conduit with which they are used on.
 - b. Threadless type: Gland compression or self-threading type, concrete tight.
 6. Unions:
 - a. Threaded galvanized steel or zinc plated malleable iron.
 7. Conduit bodies (elbows and tees):
 - a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
 - b. Standard and mogul size.
 - c. Cover: Clip-on type with stainless steel screws. Gasketed or non-gasketed galvanized steel, zinc plated cast iron or cast copper free aluminum.
 8. Conduit bodies (round):
 - a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
 - b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron or cast copper free aluminum.
 9. Sealing fittings:
 - a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
 - b. Standard and mogul size.
 - c. With or without drain and breather.
 - d. Fiber and sealing compound: UL listed for use with the sealing fitting.
 10. Service entrance head.
 - a. Malleable iron, galvanized steel or copper free aluminum.
 - b. Insulated knockout cover for use with a variety of sizes and number of conductors.
 11. Expansion couplings:
 - a. 2 IN nominal straight-line conduit movement in either direction.
 - b. Galvanized steel with insulated bushing.
 - c. Gasketed for wet locations.
 - d. Internally or externally grounded.
 12. Expansion/deflection couplings:
 - a. 3/4 IN nominal straight-line conduit movement in either direction.
 - b. 30-degree nominal deflection from the normal in all directions.
 - c. Metallic hubs, neoprene outer jacket and stainless steel jacket clamps.
 - d. Internally or externally grounded.
 - e. Watertight, raintight and concretetight.
 13. Standards: UL 467, 514B, 886.
- B. Fittings for Use with PVC-RGS:
1. The same material and construction as those fittings listed under paragraph "Fittings for Use with RGS " and coated as defined under paragraph "PVC Coated Rigid Steel Conduit (PVC-RGS)."
- C. Fittings for Use with FLEX-LT:
1. Connector:
 - a. Straight or angle type.
 - b. Metal construction, insulated and gasketed.
 - c. Composed of locknut, grounding ferrule and gland compression nut.
 - d. Liquidtight.
 2. Standard: UL 476, 514B.

UC-65

D. Fittings for Use with Rigid Non-Metallic Conduit:

1. Coupling and adapters shall be of the same material, thickness, and construction as the conduits with which they are used.
2. Standards: UL 651, NEMA TC-2.
3. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.
 - a. Standard: ASTM D2564.

2.7 CONDUIT SUPPORT SYSTEMS

A. Multi-conduit surface or trapeze type support:

1. Material requirements.
 - a. Stainless steel: AISI Type 316.
 - b. PVC coat galvanized steel: ASTM A123 or ASTM A153 and 20 mil PVC coating.

B. Single conduit support fasteners:

1. Material requirements.
 - a. Stainless steel.
 - b. Malleable iron.
 - c. PVC coat malleable iron or steel: 20 mil PVC coating.

2.8 OPENINGS AND PENETRATIONS IN WALLS AND FLOORS

A. Provide sleeves, smoke and fire stop fitting through walls and floors:

2.9 ALL RACEWAY AND FITTINGS

A. Mark Products:

1. Identify the nominal trade size on the product.
2. Stamp with the name or trademark of the manufacturer.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Shall be in accordance with the requirements of NFPA 70.

B. Size of Raceways:

1. Raceway sizes are shown on the Drawings, if not shown on the Drawings, then size in accordance with NFPA 70.
2. Unless specifically indicated otherwise, the minimum raceway size shall be:
 - a. Conduit: 3/4 IN.
 - b. Wireway: 2.5 IN x 2.5 IN.

C. Field Bending and Cutting of Conduits:

1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
2. Do not reduce the internal diameter of the conduit when making conduit bends.
3. Prepare tools and equipment to prevent damage to the PVC coating.
4. Degrease threads after threading and apply a zinc rich paint.
5. Debur interior and exterior after cutting.

D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.

E. The protective coating integrity of conduits, fittings, and accessories shall be maintained.

1. Repair RGS utilizing a zinc rich paint.
2. Repair PVC-RGS utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-

UC-66

- 1 linked silicone composition strip, followed by a protective coating of vinyl tape. The total
- 2 nominal thickness: 40 mil.
- 3 3. Repair surfaces which will be inaccessible after installation prior to installation.
- 4 F. Remove moisture and debris from conduit before wire is pulled into place.
- 5 1. Pull mandrel with diameter nominally 1/4 IN smaller than the interior of the conduit, to
- 6 remove obstructions.
- 7 2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
- 8 3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.
- 9 G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.
- 10 H. Fill openings in walls, floors, and ceilings and finish flush with surface.
- 11 1. See Section 01800.

3.2 RACEWAY ROUTING

- 12 A. Raceways shall be routed in the field unless otherwise indicated.
- 13 1. Conduit and fittings shall be installed, as required, for a complete system that has a neat
- 14 appearance and is in compliance with all applicable codes.
- 15 2. Run in straight lines parallel to or at right angles to building lines.
- 16 3. Do not route conduits through areas of high ambient temperature or radiant heat.
- 17 4. Conduit shall not interfere with, or prevent access to, piping, valves, ductwork, or other
- 18 equipment for operation, maintenance and repair.
- 19 5. Provide pull boxes or conduit bodies as needed so that there is a maximum of 360 degrees
- 20 of bends in the conduit run.
- 21
- 22 B. Maintain minimum spacing between parallel conduit and piping runs in accordance with the
- 23 following:
- 24 1. Between instrumentation and telecommunication: 1 IN.
- 25 2. Between instrumentation and 125V, 48V and 24V DC, 2 IN.
- 26 3. Between instrumentation and 600V and less AC power or control: 6 IN.
- 27 4. Between instrumentation and greater than 600V AC power: 12 IN.
- 28 5. Between telecommunication and 125V, 48V and 24V DC, 2 IN.
- 29 6. Between telecommunication and 600V and less AC power or control: 6 IN.
- 30 7. Between telecommunication and greater than 600V AC power: 12 IN.
- 31 8. Between 125V, 48V and 24V DC and 600V and less AC power or control: 2 IN.
- 32 9. Between 125V, 48V and 24V DC and greater than 600V AC power: 2 IN.
- 33 10. Between 600V and less AC and greater than 600V AC: 2 IN.
- 34 11. Between process, gas, air and water pipes: 6 IN.
- 35 C. Conduits shall be installed to eliminate moisture pockets. Where water cannot drain to openings,
- 36 provide drain fittings in the low spots of the conduit run.
- 37 D. Conduit shall not be routed on the exterior of structures except as specifically indicated on the
- 38 Drawings.
- 39 E. Where sufficient room exists within the housing of roof-mounted equipment, the conduit shall
- 40 be stubbed up inside the housing.
- 41 F. Conduit embedded in columns and floor slabs or buried under slab-on-grade:
- 42 1. Run in the most direct, practical route.
- 43 2. Not to be installed under equipment pads.
- 44 3. No crossovers.
- 45 4. Secured in place to prevent movement during the backfill and pour.
- 46 G. Conduits and accessories embedded in concrete where shown on the Contract Drawings:
- 47 1. Shall not be considered to replace structurally the displaced concrete except as indicated in
- 48 the following:

UC-67

- a. Conduit and fittings shall not displace more than 4 percent of the area of the cross-section of a column on which stress is calculated or which is required for fire protection.
- b. Size and locate sleeves or conduits passing through floors, walls, or beams so as not to significantly impair the strength of the construction.
- c. Sleeves or conduits passing through floors, walls or beams may be considered as replacing the displaced concrete structurally in compression.
 - 1) Shall not be exposed to rusting or other deterioration.
 - 2) Nominal inside diameter shall not exceed 2 IN.
 - 3) Minimum spacing: 3 DIA OC.
2. Shall not be larger in outside diameter than one-third the thickness of the slab, column or beam.
3. Shall have a minimum spacing of 3 DIA OC.
4. In reinforced concrete construction:
 - a. Conduit shall not be run in beams.
 - b. Place conduit after reinforcing steel has been laid.
 - c. The reinforcement steel shall not be displaced by the conduit.
 - d. Provide a minimum of 4-IN of cover over conduit, excluding surface finish.
 - e. Conduits parallel to main reinforcement shall be run near the center of the wall.
 - f. Conduits perpendicular to main reinforcement shall be run midway between wall or slab supports.

3.3 RACEWAY APPLICATIONS:

- A. Raceway types to be used per wire or cable types:
 1. Power wire or cables: All raceway types.
 2. Control wire or cables: All raceway types.
 3. Instrumentation cables: Metallic raceway only.
- B. Raceway types to be used per the following area designations.
 1. Wet and/or Corrosive areas:
 - a. PVC-RGS.
 - b. FLEX-LT.
 - c. NEMA 4X rated wireway.
 - d. Threaded Rigid metallic conduit.
 2. Class I hazardous areas:
 - a. PVC-RGS in corrosive areas as required herein.
 - b. FLEX-LT in Division 2 areas.
- C. FLEX-LT conduits shall be install as the final conduit connection to light fixtures, motors, (except in wet well) electrically operated valves, instrumentation primary elements, and other electrical equipment that is liable to vibrate. The maximum length shall not exceed:
 1. 6 FT to light fixtures.
 2. 3 FT to motors.
 3. 2 FT to all other equipment.
- D. NEMA 4X rated wireway:
 1. Surface mounted in areas designated as wet and or corrosive.

3.4 CONDUIT FITTINGS AND ACCESSORIES

- A. Conduit Seals:
 1. Installed in conduit systems located in hazardous areas as required by the NFPA 70.
 2. All conduits penetrating wet well shall be equipped with conduit seals. Seals shall be located below starter and/or control panels.
- B. Rigid non-metallic conduit and fittings shall be joined utilizing solvent cement.
 1. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated 1/4 turn to provide uniform contact.

UC-68

- C. Install expansion fittings:
 - 1. Where conduits span structural expansions joints.
 - 2. Where conduits are exposed to the sun and conduit run is greater than 200 FT.
 - 3. Where as identified on the Drawings.

- D. Install expansion/deflection fittings:
 - 1. Where conduits enter a structure.
 - a. Except electrical manholes and handholes.
 - b. Except where the ductbank is tied to the structure with rebar.
 - 2. Elsewhere as identified on the Drawings.

- E. Threaded connections shall be made wrench-tight.

- F. Conduit joints shall be watertight.
 - 1. Where subjected to possible submersion.
 - 2. In areas classified as wet.
 - 3. Underground.

- G. Terminate conduits:
 - 1. In NEMA 4 and 4X rated enclosures:
 - a. With a threaded, insulated and gasketed hub.

- H. Threadless couplings shall not be used.

3.5 CONDUIT SUPPORT:

- A. Multi-conduit surface or trapeze type support system to be used per the following area designations and conduit types:
 - 1. Corrosive areas:
 - a. Stainless steel system consisting of: Stainless steel channels and fittings, nuts and hardware and conduit clamps.
 - b. PVC coated steel system consisting of: PVC coated galvanized steel channels and fittings and conduit clamps with stainless steel nuts and hardware.
 - 2. Conduit type shall be compatible with the support system material.
 - a. Stainless steel system may be used with RGS and PVC-RGS.
 - b. PVC coated galvanized steel system may be used with PVC-RGS.
- B. Single conduit support fasteners to be used per the following area designations and conduit types:
 - 1. Wet and/or Corrosive areas:
 - a. Material: Stainless steel and PVC coat malleable iron or steel.
 - b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
- C. In seismic locations provide required sway bracing per local building codes.
- D. Conduit support general requirements:
 - 1. Maximum spacing between conduit supports per NFPA 70.
 - 2. Support conduit from the building structure.
 - 3. Do not support conduit from process, gas, air or water piping; or from other conduits.
 - 4. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS or to the maximum uniform load recommended by the manufacturer if the support is rated less than 25 LBS.
 - a. Do not exceed maximum concentrated load recommended by the manufacturer on any support.
 - b. Conduit hangers: Continuous threaded rods combined with struts or conduit clamps: Do not use perforated strap hangers and iron bailing wire.
 - c. Do not use suspended ceiling support systems to support raceways.
 - d. Hangers in metal roof decks:
 - 1) Utilize fender washers.

UC-69

- 1
 - 2
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- 2) Not extend above top of ribs.
 - 3) Not interfere with vapor barrier, insulation, or roofing.
5. Conduit support system fasteners:
 - a. Use sleeve-type expansion anchors as fasteners in masonry wall construction. Do not use concrete nails and powder-driven fasteners.

6

END OF SECTION

UC-70

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SECTION 16135

3

ELECTRICAL: EXTERIOR UNDERGROUND

4

PART 1 - GENERAL

5

1.1 SUMMARY

6

A. Section Includes:

7

1. Underground conduits and ductbanks.

8

1.2 QUALITY ASSURANCE

9

A. Referenced Standards:

10

1. American Association of State Highway & Transportation Officials (AASHTO).

11

2. American Society for Testing Materials (ASTM):

12

- a. A536, Standard Specification for Ductile Iron Castings.

13

3. National Fire Protection Association (NFPA):

14

- a. 70, National Electrical Code (NEC).

15

1.3 DEFINITIONS

16

- A. Direct-buried conduit means individual (single) underground conduits without concrete encasement.**

17

18

- B. Direct-buried ductbank means multiple underground conduits, arranged in one or more planes, in a common trench, without concrete encasement.**

19

20

- C. Concrete encased ductbank means an individual (single) or multiple conduit(s), arranged in one or more planes, encased in a common concrete envelope.**

21

22

1.4 SUBMITTALS

23

- A. Follow NC DOT process for all submittals**

24

PART 2 - PRODUCTS

25

2.1 UNDERGROUND CONDUIT AND ACCESSORIES

26

- A. Conduit: See Section 16131.**

27

B. Warning Tape:

28

1. Approved manufacturers and catalog numbers:

29

- a. W H Brady Company, Catalog S-10, #91296.

30

2. Material: Polyethylene.

31

3. Thickness: 3.5 mils.

32

4. Tensile strength: 1750 psi.

33

5. Size: 6 IN wide (minimum).

34

6. Legend:

35

- a. Preprinted and permanently imbedded.

36

- b. Message continuously printed.

37

PART 3 - EXECUTION

38

3.1 GENERAL

UC-71

- A. Drawings indicate the intended location and routing of direct buried conduit. Field conditions may affect actual routing.
- B. Install products in accordance with manufacturer's instructions.

3.2 UNDERGROUND CONDUITS:

A. General Installation Requirements:

1. Do not place concrete or soil until conduits have been observed by the Engineer.
2. Ductbanks shall be sloped a minimum of 4 IN per 100 FT or as detailed on the Drawings. Low points shall be at manholes or handholes.
3. During construction and after conduit installation is complete, plug the ends of all conduits.
4. Provide conduit supports and separators of concrete, plastic, or other suitable nonmetallic nondecaying material designed for that purpose.
 - a. Place supports and separators for rigid nonmetallic conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1 IN and less: 3 FT.
 - 2) 1-1/4 to 3 IN: 5 FT.
 - 3) 3-1/2 to 6 IN: 7 FT.
 - b. Place supports and separators for rigid steel conduit on maximum centers as indicated for the following trade sizes:
 - 1) 1 IN and less: 10 FT.
 - 2) 1-1/4 to 2-1/2 IN: 14 FT.
 - 3) 3 IN and larger: 20 FT.
 - c. Securely anchor conduits to supports and separators to prevent movement during placement of concrete or soil.
5. Stagger conduit joints at intervals of 6 IN vertically.
6. Make conduit joints watertight and in accordance with manufacturer's recommendations.
7. Accomplish changes in direction of runs exceeding a total of 5 degrees by long sweep bends having a minimum radius of 25 FT. Sweep bends may be made up of one or more curved or straight sections or combinations thereof.
8. Furnish manufactured bends at end of runs. Minimum radius of 18 IN for conduits less than 2 IN trade size and 36 IN for conduits 2 1/2 IN trade size and larger.
9. Field cuts requiring tapers shall be made with the proper tools and shall match factory tapers.
10. After the conduit run has been completed, pull a standard flexible mandrel having a length of not less than 12 IN and a diameter approximately 1/4 IN less than the inside diameter of the conduit through each conduit. Then pull a brush with stiff bristles through each conduit to remove any foreign material left in conduit.
11. Pneumatic rodding may be used to draw in lead wire.
 - a. Install a heavy nylon cord free of kinks and splices in all unused new ducts.
 - b. Extend cord 3 FT beyond ends of conduit.
12. Transition from PVC to RGS conduit a minimum of 5 FT prior to entering a structure or going above ground. Except PVC conduit may be extended directly to manholes, handholes, pad mounted transformer boxes and other exterior pad mounted electrical equipment.
 - a. Terminate rigid PVC conduits with end bells.
 - b. Terminate steel conduits with insulated bushings.
13. Place warning tape in trench directly over ductbanks, direct-buried conduit, and direct-buried wire and cable; Warning tape shall be at least 12" above buried conduits.
 - a. Trenches containing electrical power:
 - 1) Legend: CAUTION CAUTION CAUTION (1st line), BURIED ELECTRIC LINE (2nd line).
 - 2) Letters: 1-1/4 IN minimum.
 - 3) Interval: Continuous.
 - 4) Color: Red and black letters.

B. Direct-Buried Ductbank:

UC-72

- 1 1. Ductbank system consists of conduits directly buried in earth with separations between
- 2 different cabling types as required in Section 16131 or as detailed on the Drawings.
- 3 2. Install so that the top of the uppermost conduit, at any point, is not less than 24 IN below
- 4 grade.
- 5 3. Provide a uniform minimum clearance of 2 IN between conduits or as required in Section
- 6 16131 for different cabling types. Maintain the separation by:
- 7 a. The use of conduit supports and separators.
- 8 b. Installing the multilevel ductbank one level at a time. Each level is backfilled with the
- 9 appropriate amount of soil to maintain the required separations.
- 10 C. Direct-Buried Conduit:
- 11 1. Ductbank system consisting of a conduit directly buried in earth.
- 12 2. Install so that top of conduit, at any point, is not less than 24 IN below grade.
- 13 D. Conduits embedded in concrete structure (e.g., sidewalks, bridge decks) where shown on the
- 14 Contract Drawings:
- 15 1. Shall not be considered to replace structurally the displaced concrete except as indicated in
- 16 the following:
- 17 2. Shall not be larger in outside diameter than one-third the thickness of concrete.
- 18 3. Shall have a minimum spacing of 3 DIA OC.
- 19 4. In reinforced concrete construction:
- 20 a. Place conduit after reinforcing steel has been laid.
- 21 b. The reinforcement steel shall not be displaced by the conduit.
- 22 c. Provide a minimum of 1-1/2 IN of cover over conduit.

END OF SECTION

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SECTION 16150

3

PANELBOARDS4 **PART 1 - GENERAL**5 **1.1 SUMMARY**

6 A. Section Includes:

7 1. Lighting panelboards and distribution panelboards.

8 **1.2 QUALITY ASSURANCE**

9 A. Referenced Standards:

- 10 1. National Electrical Manufacturers Association (NEMA):
 - 11 a. PB 1, Panelboards.
- 12 2. National Fire Protection Association (NFPA):
 - 13 a. National Electric Code (NEC).
- 14 3. Underwriters Laboratories, Inc (UL):
 - 15 a. 67, Panelboards.
 - 16 b. 50, Cabinets and Boxes.
 - 17 c. 489, Molded Case Circuit Breakers.
 - 18 d. 943, GFCI.
 - 19 e. 1449, Safety Transient Voltage Surge Suppressors.

20 **1.3 SUBMITTALS**

21 A. Follow NC DOT process for all submittals

22 **PART 2 - PRODUCTS**23 **2.1 ACCEPTABLE MANUFACTURERS**24 A. Subject to compliance with the Contract Documents, the following manufacturers are
25 acceptable:

- 26 1. Panelboards and circuit breakers:
 - 27 a. General Electric.
 - 28 b. Square D.
 - 29 c. Cutler-Hammer/Westinghouse.
 - 30 d. Siemens.

31 B. Submit requests for substitution to Engineer.

32 **2.2 MANUFACTURED UNITS**

33 A. Panelboards:

- 34 1. UL 67 listed.
- 35 2. Designed in accordance with NEC Article 384.
- 36 3. Dead-front type.
- 37 4. Fronts:
 - 38 a. Steel reinforced.
 - 39 b. Concealed or semi-concealed hinges.
 - 40 c. Trim adjusting screws.
 - 41 d. Directory card mounted inside front door.
 - 42 e. Corrosionproof lock with retractable latch.
 - 43 f. Surface or flush mounting as required.

UC-74

- 1 5. Bus bars:
 - 2 a. Sequenced phased.
 - 3 b. Fully insulated.
 - 4 c. Drilled and tapped on circuit pole centers.
- 5 6. Main lugs:
 - 6 a. Solderless type.
 - 7 b. Approved for copper and aluminum UL listed wire.
- 8 7. Solid neutral bar with solderless mechanical type connectors. Isolated neutral bar for sub-panels.
- 9
- 10 8. Non-insulated grounding strip including:
 - 11 a. Main ground lug.
 - 12 b. Individual grounding terminals for each circuit breaker and circuit breaker space.
- 13 9. Maximum panel voltage:
 - 14 a. 240 V AC for lighting panelboards.
 - 15 b. 600 V AC for distribution panelboards.
- 16 10. See Drawings for additional requirements.
- 17 B. Panel Boxes and Cabinets:
 - 18 1. UL 50 listed.
 - 19 2. Gutter space per NEC and UL requirements.
 - 20 3. Code gage 316 stainless steel.
 - 21 4. Furnish with knockouts in side, top and bottom panels.
 - 22 5. Nominal 5-3/4 IN deep.
 - 23 6. Enclosure rated NEMA 4X.
- 24 C. Circuit Breakers:
 - 25 1. Current rating as indicated on the Drawings.
 - 26 2. Thermal-magnetic type, UL listed:
 - 27 a. Over-center, toggle handle operated.
 - 28 b. Quick-make, quick-break action.
 - 29 1) Independent of toggle handle operation.
 - 30 c. Common tripping of all poles.
 - 31 d. Molded-in ON and OFF markings on breaker cover.
 - 32 e. Bolt-on type.
 - 33 f. Three-position handles indicating ON, OFF and TRIPPED.
 - 34 g. Removable from front of panelboard without disturbing adjacent circuit breakers.
 - 35 h. One-, two- or three-pole as indicated on the Drawings.
 - 36 i. Rated 10,000 AIC, minimum, unless a higher interrupting rating is noted on the Drawings.
 - 37 j. Tandem or half-size circuit breakers shall not be used.
 - 38 3. GFCI type, UL listed:
 - 39 a. Characteristics as indicated for the thermal-magnetic type above:
 - 40 1) Except one- or two-pole as indicated on the Drawings.
 - 41 2) Plus the following features:
 - 42 a) Class A ground fault circuit.
 - 43
 - 44

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Install per manufacturer's instructions.
- B. Install in accordance with the NEC.
- C. Provide each panelboard with a typed "as installed" directory.

UC-75

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END OF SECTION

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SECTION 16442

MOTOR CONTROL EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Motor control centers.
 - 2. Separately mounted motor starters (including those supplied with equipment).
 - 3. Manual motor starters.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. C62.41, Guide for Surge Voltages in Low Voltage AC Power Circuits.
 - 2. Canadian Standards Association (CSA).
 - 3. Institute of Electrical and Electronics Engineers (IEEE).
 - 4. National Electrical Manufacturers Association (NEMA):
 - a. ICS 2, Industrial Control Devices, Controllers, and Assemblies.
 - b. 250, Enclosures for Electrical Equipment (1000 Volt Maximum).
 - 5. National Fire Protection Association (NFPA):
 - a. 70, National Electrical Code (NEC).
 - 6. Underwriters Laboratories, Inc (UL):
 - a. 845, Electric Motor Control Centers.
- B. Miscellaneous:
 - 1. Verify motor horsepower loads, other equipment loads, and controls from approved shop drawings and notify Engineer of any discrepancies.
 - 2. Verify the required instrumentation and control wiring for a complete system and notify Engineer of any discrepancies.

1.3 SUBMITTALS

- A. Follow NC DOT process for all submittals

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Separately mounted motor starters:
 - a. General Electric.
 - b. Square D.
 - c. Cutler Hammer.
 - d. Siemens.
- B. Submit requests for substitution to Engineer.

2.2 SEPARATELY MOUNTED COMBINATION STARTERS:

- A. Standards: NEMA 250.
- B. Enclosure:

1. NEMA 4X rated:
 - a. Body and cover: Type 304 or 316 stainless steel.
 - b. No knockouts, external mounting flanges, hinged and gasketed door.
- C. Operating handle:
 - a. With the door closed the handle mechanism allows complete ON/OFF control of the unit disconnect and clear indication of the disconnect status.
 - b. Circuit breaker and MCP operators includes a separate TRIPPED position.
 - c. Mechanical interlock to prevent the opening of the door when the disconnect is in the ON position with a defeater mechanism for use by authorized personnel.
 - d. Mechanical interlock to prevent the placement of the disconnect in the ON position with the door open with a defeater mechanism for use by authorized personnel.
 - e. Padlockable in the OFF position.
- D. External mounted overload relay pushbutton.
- E. Control power transformer:
 1. 120 Volt secondary.
 2. Fused on primary and secondary side.
 3. Sized for 140 percent of required load.
- F. Fault current withstand rating: Equal to the rating of the electrical gear from which it is fed.
- G. Motor Starters: See requirements within this section.
- H. Disconnect switch: Non-fusible, double break, rotary blades and quick-make quick-brake action.
- I. Overcurrent and Short Circuit Protective Devices:
 1. Motor protection with full voltage starters:
 - a. Motor circuit protector.
 2. Motor protection with reduced voltage starters:
 - a. Motor circuit protector.
 3. Factory installed.

2.3 MOTOR STARTERS

- A. Full Voltage Non-Reversing (FVNR) Magnetic Starters:
 1. Contactor shall be NEMA full size rated.
 - a. NEMA half sizes and IEC contactors are not permitted.
 2. Double-break silver alloy contacts.
 3. Overload relays:
 - a. Ambient compensated, bimetallic type with interchangeable heaters, +/-24 percent adjustability, single phase sensitivity, an isolated arm contact and manual reset.
 4. Interlock and auxiliary contacts, wired to terminal blocks:
 - a. Holding circuit contact, normally open.
 - b. Overload alarm contact, normally open.
 - c. Normally open auxiliary contact, for remote run status.
 - d. Two additional normally open spare field replaceable auxiliary contacts.
- B. Reduced Voltage Autotransformer (RVAT) Starter.
 1. Closed transition design using three contactors and two or three autotransformers.
 2. Transformer taps: 50, 65 and 80 percent, factory set at 65 percent.
 3. Contactors shall be NEMA full size rated.
 - a. NEMA half sizes and IEC contactors are not permitted.
 4. Double-break silver alloy contacts.
 5. Overload relays:
 - a. Ambient compensated, bimetallic type with interchangeable heaters, +/- 24 percent adjustability, single phase sensitivity, an isolated arm contact and manual reset.
 6. Interlock and auxiliary contacts, wired to terminal blocks:
 - a. Holding circuit contact, normally open.

- 16 **END OF SECTION**

SECTION 16901**PRIMARY ELEMENTS AND TRANSMITTERS****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Level components.

1.2 QUALITY ASSURANCE**A. Referenced Standards:**

1. American Iron and Steel Institute (AISI).
2. American National Standards Institute (ANSI):
 - a. B16.5, Pipe Flanges and Flanged Fittings.
 - b. B16.22, Wrought Copper and Bronze Solder-Joint Pressure Fittings.
 - c. PTC 19.3, Instruments and Apparatus, Part 3 Temperature Measurement.
 - d. MC96.1, Temperature Measurement Thermocouples.
3. American Society of Mechanical Engineers (ASME):
 - a. B31.1, Power Piping.
 - b. SEC II-A SA-182, Standard Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature.
 - c. SEC II-A SA-479, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
 - d. Fluid Meters, Sixth Edition.
4. American Society for Testing and Materials (ASTM):
 - a. A106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
 - b. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
 - c. A182, Standard Specification for Forged or Rolled Alloy - Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service.
 - d. A234, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
 - e. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
 - f. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - g. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - h. A479, Standard Specification for Stainless Steel Bars and Shapes for use in Boilers and other Pressure Vessels.
 - i. B16, Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines.
 - j. B32, Standard Specification for Solder Metal.
 - k. B68, Standard Specification for Seamless Copper Tube, Bright Annealed.
 - l. B75, Standard Specification for Seamless Copper Tube.
 - m. B88, Standard Specification for Seamless Copper Water Tube
 - n. B124, Standard Specification for Copper and Copper-Alloy Forging Rod, Bar, and Shapes.
 - o. B283, Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed).
 - p. B453, Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Rod.

- 1 q. B61, Standard Specification for Steam or Valve Bronze Castings.
- 2 5. National Electrical Manufacturers Association (NEMA):
- 3 a. ICS 6, Enclosures for Industrial Controls and Systems.

4 **1.3 SYSTEM DESCRIPTION**

- 5 A. The instruments specified in this Section are the primary element components for the controls
- 6 shown on Contract Documents.

7 **1.4 SUBMITTALS**

- 8 A. Follow NC DOT process for all submittals

9 **PART 2 - PRODUCTS**

10 **2.1 ACCEPTABLE MANUFACTURERS**

- 11 A. Subject to compliance with the Contract Documents, the Manufacturers listed in the articles
- 12 describing the elements are acceptable.
- 13 B. Submit requests for substitutions in accordance with Specification Section 01340.

14 **2.2 LEVEL ELEMENTS**

- 15 A. Float-Tilt Type Level Switches:
- 16 1. Acceptable manufacturers:
- 17 a. Anchor Scientific, Inc.
- 18 b. Consolidated Electric.
- 19 2. Materials:
- 20 a. Float material: Polypropylene or Teflon coated type 316 stainless steel.
- 21 b. Cable jacket: PVC, neoprene or equal.
- 22 c. Cable clamp: Polypropylene or 316 stainless steel.
- 23 3. Design and fabrication:
- 24 a. Switches shall be UL listed for installation in a Class 1 Div. 1 Group D hazardous area.
- 25 b. Sealed mercury switch in float.
- 26 c. Provide switch complete with flexible electrical cables.
- 27 d. SPDT contact rated at 4.5A at 120 V AC.
- 28 e. Direct acting float switch:
- 29 1) Switch actuates on rising level.
- 30 2) Switch deactuates when liquid falls 1 IN below actuation level.
- 31 f. Terminate cables in junction box.
- 32 g. Process temperature: 100°F max.
- 33 h. Install floats per Drawing details.

34

35 **2.3 ACCESSORIES**

- 36 A. Furnish all mounting brackets, hardware and appurtenances required for mounting primary
- 37 elements and transmitters.
- 38 1. Materials, unless otherwise specified, shall be as follows:
- 39 a. Bolts, nuts, washers, expansion anchors: 316 stainless steel.
- 40 b. Mounting brackets:
- 41 1) Standard: 316 stainless steel.
- 42 c. Mounting plates, angles:
- 43 1) Standard: Galvanized steel.
- 44 d. Instrument pipe stands:
- 45 1) Standard: Hot-dip galvanized 2 IN schedule 40, ASTM A106, Grade B carbon
- 46 steel.

- 1 B. Cable lengths between sensors and transmitters shall be continuous (without splices) and as
2 required to accommodate locations as shown on Drawings.

3 **PART 3 - EXECUTION**

4 **3.1 INSTALLATION**

- 5 A. Install products in accordance with manufacturer's instructions.
- 6 B. Install instrument mounting pipe stands level and plumb.
- 7 C. Instrument Valves:
- 8 1. Orient stems for proper operation.
- 9 2. Install arrays orderly and neat in appearance with true horizontal and vertical lines.
- 10 3. Provide a minimum of 2 IN clearance between valve handle turning radii where there are
- 11 multiple valve handles appearing in a straight line.
- 12 4. Valves shall have bonnets and any soft seals removed during welding or soldering into the
- 13 line. When cool, reassemble the valves.
- 14 5. Support each valve individually. The tubing system does not qualify as support for the
- 15 valve.
- 16 D. Locate instrument piping and tubing so as to be free of vibration and interference with other
- 17 piping, conduit, or equipment.
- 18 E. Keep foreign matter out of the system.
- 19 F. Remove all oil on piping and tubing with solvent before piping and tubing installation.
- 20 G. Plug all open ends and connections to keep out contaminants.
- 21 H. Instrument Mounting:
- 22 1. Mount all instruments where they will be accessible from fixed ladders, platforms, or grade.
- 23 2. Mount all local indicating instruments with face forward toward the normal operating area,
- 24 within reading distance, and in the line of sight.
- 25 3. Mount instruments level, plumb, and support rigidly.
- 26 4. Mount to provide:
- 27 a. Protection from heat, shock, and vibrations.
- 28 b. Accessibility for maintenance.
- 29 c. Freedom from interference with piping, conduit and equipment.

30 **3.2 TRAINING**

- 31 A. Provide on-site training as required to instruct OWNER in proper operation.

32 **END OF SECTION**

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UC-83

3. Motor Control: Each pump motor is controlled by a combination reduced voltage auto transformer type starter. One control panel shall be designed, fabricated, installed, and connected to provide the necessary controls for the two pumps. The following controls are required:
 - a. Pump 1 – Auto – Pump 2. Lead lag selector switch.
 - b. Red call for lead pump indicating light.
 - c. Red call for lag pump indicating light.
 - d. Alternator relay for starting opposite motor with each new start when selector is in auto.
 - e. Time delay relay to prevent start of lag pump at same time as lead pump.
 - f. Power on relay to isolate lead pump start circuit during power failure.
 - g. White power on indicating light.
 - h. Relay contact for connection to generator transfer switch. Contact to close when led pump is called to run. Contact to be used to start generator when lead pump is called to run and transfer switch detects loss of power.
 - i. Relay contact to light alarm light when wet well reaches high high level.
 - j. A UPS shall be provided to maintain lead pump start relay control power during power failure.
 - k. Individual pump controls:
 - 1) Manual off-auto selector switch.
 - 2) Start push button for use in manual only.
 - 3) Stop push button for use in manual only.
 - 4) Red run indicating light.
 - 5) Run time hour meter.
4. Generator Control: The emergency generator shall provide back up power when normal power is lost and the pump control requires the lead pump to run. The generator shall remain running at least five minutes after control calls for pump stop. If after pump stops, normal power returns, the transfer switch shall return to normal position. If normal power does not return the generator shall shut down until pumps are called to run again. If normal power returns while pump is running transfer to normal shall be delayed until pump stops or 5 minutes elapse, which ever comes first.
5. Auto dialer required for the following alarm conditions
 - a. High Wet Well Level
 - b. Seal Pump Failure
 - c. Pump Failure
 - d. Power Outage

END OF SECTION

UC-84

1 **SECTION 16903**
2 **RECORDERS - DIALERS**

3 **PART 1 - GENERAL**

4 **1.1 SUMMARY**

- 5 A. Section Includes:
6 1. Graphic recorder.

7 **1.2 QUALITY ASSURANCE**

- 8 A. Referenced Standards:
9 1. National Electrical Manufacturers Association (NEMA):
10 a. ICS 6, Enclosures for Industrial Controls and Systems.

11 **1.3 SUBMITTALS**

- 12 A. Follow NC DOT process for all submittals

13 **PART 2 - PRODUCTS**

14 **2.1 ACCEPTABLE MANUFACTURERS**

- 15 A. Subject to compliance with the Contract Documents, the manufacturers listed in the
16 paragraphs describing the devices are acceptable:
17 B. Submit requests for substitution in accordance with Specification Section 01640.

18 **2.2 RECORDERS - DIALERS**

- 19 A. Dialers:
20 1. Acceptable manufacturers:
21 a. Sensaphone
22 b. Kaye
23 c. Or approved equal
24

25 **2.3 ACCESSORIES – NOT USED –**

26 **PART 3 - EXECUTION**

27 **3.1 INSTALLATION**

- 28 A. Install products in accordance with manufacturer's instructions.

29 **END OF SECTION**

SECTION 16907**CONTROL PANELS AND ENCLOSURES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Control panels.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. American Society for Testing and Materials (ASTM):
 - a. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 2. National Electrical Manufacturers Association (NEMA):
 - a. ICS 4, Terminal Blocks for Industrial Use.
 - b. ICS 6, Enclosures for Industrial Controls and Systems.
 - c. 250, Enclosures for Electrical Equipment (1000 V Maximum).
 3. National Fire Protection Association (NFPA):
 - a. National Electric Code (NEC).
 4. Underwriters Laboratories Inc. (UL):
 - a. UL 508, Industrial Control Equipment.
- B. Miscellaneous:
1. Obtain approved control panel layouts prior to installation of conduit feeds
 2. Provide completely matching color tones for any individual color specified.
 3. Provide panel with NEMA 4X rating.
 4. Approved supplier of Industrial Control Equipment under provisions of UL 508. Entire assembly shall be affixed with a UL 508 label "Listed Enclosed Industrial Control Panel" prior to shipment to the jobsite. Any control panel which arrives to the jobsite without an UL 508 label shall be rejected and sent back to the panel shop.

1.3 DEFINITIONS

- A. The term "panel" refers to any control panel or enclosure listed in the schedule included in this specification section.
- B. Foreign voltages: Voltages present in circuit even when the panel main power is disconnected.

1.4 SUBMITTALS

- A. Shop Drawings:
1. Statement of panel wiring methods including wire type, insulation colors, insulation rating, wire sized, wire routing, and wire labeling strategy to be implemented during panel fabrication.
 2. Letter documenting UL 508 capabilities.
 3. Scaled panel face and subpanel face instrument and nameplate layout drawings.
 4. Panel and subpanel materials of construction.
 5. Panel and subpanel dimensions and weights.
 6. Panel access openings.
 7. Conduit and wiring access locations.
 8. Internal wiring and terminal block drawings.
 9. Internal component layout to scale.
 10. Nameplate text.

- 1 11. Total electrical load of panels and enclosures.
- 2 B. As-Built Drawings:
- 3 1. Update the control panel drawings and ship at least one copy with the control panel to the
- 4 jobsite.
- 5 C. Follow NC DOT process for all submittals

6 **PART 2 - PRODUCTS**

7 **2.1 ACCEPTABLE MANUFACTURERS**

- 8 A. Subject to compliance with the Contract Documents, the following manufacturers are
- 9 acceptable:
- 10 1. Enclosures:
- 11 a. Hoffman Engineering Co.
- 12 B. Submit requests for substitution to Engineer.

13 **2.2 MATERIALS**

- 14 A. Front Panel, Subpanel or Front Door: Stainless steel.
- 15 B. Frame and Bottom Angles: Stainless steel.
- 16 C. Top, Sides, Back, Sides, and Back Door: Stainless steel.
- 17 D. Hinges: Stainless steel.
- 18 E. Nameplates: Phenolic.
- 19 F. Filler Panels: Steel.

20 **2.3 ACCESSORIES**

- 21 A. Panel Nameplates and Identification:
- 22 1. Provide as required.
- 23 2. Or approved equal.

24 **2.4 FABRICATION**

- 25 A. General:
- 26 1. Fabricate panels with instrument arrangements as shown on the Drawings.
- 27 2. Finish interior of panel with epoxy glass white.
- 28 3. Provide control panel which meets the following requirements:
- 29 a. Enclosure sheet metal thickness per UL 508, subpart 7.3.
- 30 b. Bonding for continuity of grounding per UL 508, subpart 7.6.
- 31 c. Enclosure openings per UL 508, subparts 7.8 through 7.11.
- 32 d. Observation windows, if utilized, per UL 508, subpart 7.12.
- 33 e. Constructed in accordance with NEMA type per UL 508, subpart 7.15.
- 34 f. Corrosion protected per UL 508, subpart 8.
- 35 g. Tapped holes for conduit in a cast metal enclosure per UL 508, subpart 27.3
- 36 h. Knockouts in sheet-metal enclosure per UL 508, subpart 27.4
- 37 4. Provide cautionary markings, if required, in accordance with UL 508, subpart 59.
- 38 a. Locate cautionary markings per UL 508, subparts 59.1, 59.3.
- 39 b. Prefix the cautionary marking with the word "CAUTION" or "WARNING" utilizing
- 40 letters sized per UL 508, subpart 59.2.
- 41 c. If more than one disconnect switch is required to disconnect all power within a panel or
- 42 enclosure, provide a cautionary marking with the word "CAUTION" and the following
- 43 or equivalent, "Risk of Electric Shock-More than one disconnect switch required to de-
- 44 energize the equipment before servicing."

UC-87

- 1) Locate the cautionary marking on the outside of the equipment or on a stationary fixed, nonremovable part inside the equipment where easily and clearly seen.
- B. Wall Mounted Panels:
 1. Seams continuously welded and ground smooth.
 2. Rolled lip around all sides of enclosure door opening.
 3. Gasketed dust tight.
 4. Three-point latching mechanism operated by oil tight key-locking handle.
 5. Key doors alike.
 6. Continuous heavy GA hinge pin on doors.
 - a. Hinges rated for 1.5 times door plus instrument weight.
 7. After cutouts have been made, finish opening edges to smooth and true surface condition.
 8. Front full opening door.
 9. Brackets for wall mounting.
- C. Panel Front Construction:
 1. Welded construction.
 2. Edges turned and ground smooth to touch and visual appearance.
 3. At joints where panel face meets side walls, provide dustproof sponge rubber gasket entire height and face.
 4. Use full length piano hinges rated for 1.5 times door weight for panel access door.
 5. Equip doors with locking devices and handle and three point catches.
 6. Finish all instrument cutouts smooth and true.
- D. Panel Wiring and Piping:
 1. Factory wire panels to identified terminal blocks equipped with screw type lugs.
 2. Install all wiring without splicing in factory in plastic wire duct:
 - a. Do not exceed manufacturer's recommended fill limits.
 - b. Ducts shall have removable covers.
 3. Splicing and tapping of wires allowed only at terminal blocks.
 4. Wire bending space shall be in accordance with Tables 307B, C in NEMA ICS 6. Wire bunches to doors shall be secured at each end so that bending or twisting will be around longitudinal axis of wire. Protect bend area with sleeve.
 5. Keep AC power lines separate from low-level DC lines, I/O power supply cables, and all I/O rack interconnect cables. Separate by at least 6 IN, except at unavoidable crossover points and at device terminations.
 6. Arrange circuits on terminal blocks plus any spare conductors on adjacent terminals.
 7. Provide necessary power supplies for control equipment.
 8. Equip each panel with a main thermal magnetic circuit breaker. Limit load to maximum of 80 percent of circuit breaker rating.
 9. Provide all necessary stabilizing voltage transformers, balancing potentiometers and rectifiers as necessary for specific instrument requirements.
 10. Assure each panel mounted device is bonded or otherwise grounded to panel or panel grounding system by means of locknuts or pressure mounting methods.
 - a. Equip panel with grounding terminals.
 - b. All sub-panels and hinged doors shall be bonded to ground.
 11. Arrange wiring with sufficient clearance for all leads. Arrange wire neatly, cut to proper length, and remove surplus wire.
 12. Wiring to subpanels or rotary switches shall be individually bundled and installed with a "flexible loop" of sufficient length to permit the component to be removed from panel for maintenance without disconnecting wiring.
 13. AC and DC circuit conductors shall be type MTW stranded copper suitable for operation at 600 V as specified in the NEC. Conductor size shall be as required for load and {16} {18} AWG minimum.
 14. Analog signal cables shall be of 600 V, stranded copper, twisted-shielded pairs of {18} {20} AWG minimum. Ground analog cable drain conductors on grounded terminal blocks at one end of the cable only.

UC-88

15. Use only high precision 250 ohm resistors with 0.25 percent accuracy to convert 4-20 mA analog signals to 1-5 V DC analog signals. Resistor leads shall be landed under terminal clamp by itself and not with any other wires.
16. Analog signals for devices in separate enclosures shall not be wired in series. Loop isolators shall be used where analog signals are transmitted between control enclosures.
17. Identify all wires with plastic sleeve type (heat-shrinkable) wire markers at each end. Markers shall:
 - a. Identify circuit numbers.
 - b. Identify function and polarity.
18. Termination requirements:
 - a. Terminal block markings, mechanical characteristics and electrical characteristics shall be in accordance with NEMA ICS 4.
 - b. Terminals shall facilitate wire sizes as follows:
 - 1) 120 V AC applications: Wire size 12 AWG and smaller.
 - 2) Other: Wire size 14 AWG and smaller.
 - c. Provide terminal blocks with continuous marking strip.
 - d. Tag each I/O terminal to indicate tag number of the connected device.
 - e. Provide terminals for individual termination of each signal shield.
 - f. Provide 20 percent excess terminals for future expansion.
 - g. Use terminal blocks with bladed switch where control voltages enter or leave the control panel. Bladed terminal block body to be orange where foreign voltages connect to the panel.
 - h. Use fused terminal blocks where the control circuit is energizing a solenoid valve or where providing DC power to loop-powered transmitter. Blown fuse indicators to be utilized on all fused terminal blocks.
 - i. Install DIN rail along entire terminal strip area to facilitate future expansion.
 - j. Utilize busses for DC and AC control voltages within panel. Include space for expansion.
- E. Panel Lighting and Power:
 1. Receptacles:
 - a. Panels less than 4 FT long:
 - 1) One electrical GFCI outlet.
 - 2) One incandescent light fixture with switch(es) and separate circuit breakers
 2. Control Power:
 - a. Primary control voltage of the control panel shall be 120 volts AC. Provide a step down control transformer from 480 volts to 120 volts for all the internal control power required.
 - b. Provide intrinsically safe interface with the float switch control in compliance with UL913, the Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II and III, Division 1, Hazardous Location.
 3. Phase Monitoring Relay
 - a. Provide phase monitor relay at pump motor starter to prevent pumps from being operated either manually or automatically in the event of low voltage or phase loss or reversal.
- F. Environmental Controls:
 1. Each control panel and control station shall be furnished with industrial corrosion inhibitors.
 - a. Manufacturer: Hoffman A-HCI or equal.
 - b. The inhibitor contains a chemical that vaporizes and condenses on all surfaces in the enclosure.
 - c. The amount of inhibitor shall be according to manufacturer recommendation for the size of the enclosure.
 - d. Inhibitor shall be installed prior to shipment to the job-site.
- G. Transient Surge Protection:
 1. Each control panel shall be furnished with UL Listed Transient Voltage Surge Suppressor.

2. The control components within the control panel shall be powered from the protected power. The convenience receptacles, lighting, and cooling power need not be from the protected power.

H. Pump Motor Disconnect:

1. A lockable disconnect shall be provided for each pump motor and sized according to the full load current as well as the locked rotor current required for motor starting.

2.5 MAINTENANCE MATERIALS

A. Extra Materials:

1. Replacement Bulbs. Provide minimum 25 percent for replacement indicating light bulbs for each type of indicator furnished in this Project.

B. Paint Touch-Up Kit: Provide for field repair of coating damaged during shipment and installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor panels in a manner to prevent the enclosure from racking, which may cause the doors to become misaligned.

3.2 SCHEDULE

A. Schedule:

TAG					
NUMBER	LOCATION	TYPE	ACCESS	COLOR	
Local CP	East Main PS	Wall		SS	

3.3 CONTROL FUNCTION

1. General: The pump station consists of two submersible pumps controlled by float switches.
2. Float control descriptions: There will be 4 floats numbered 1 through 4 bottom to top.
 - a. Float 1 shall stop all pumps.
 - b. Float 2 shall start lead pump.
 - c. Float 3 shall start lag pump.
 - d. Float 4 shall alarm high level.
3. Motor Control: Each pump motor is controlled by a reduced voltage auto transformer starter. One control panel shall be designed, fabricated, installed, and connected to provide the necessary controls for the two pumps. The following controls are required:
 - a. Pump 1 lead – Pump 2 lead – Auto Alternate selector switch.
 - b. Red Call for lead pump, call for lag pump indicating lights.
 - c. Amber pump high temperature, seal failure and overload indicating lights.
 - d. Red globe high level alarm light mounted on top of the control panel.
 - e. Alternator relay for starting opposite motor with each new start when selector is in auto.
 - f. Time delay relay to prevent start of lag pump at same time as lead pump.
 - g. White power on indicating light.
 - h. Relay contact for connection to generator transfer switch. Contact to close when lead pump is called to run. Contact to be used to start generator when lead pump is called to run and transfer switch detects loss of power.
 - i. Relay contact to light alarm light when wet well reaches high level.

UC-90

- j. An on-line UPS shall be provided to maintain lead pump start relay control power during power failure. The UPS shall be compatible with operating under generator power.
- k. Individual pump controls:
 - 1) Hand- off-auto selector switch.
 - 2) Red run indicating light.
 - 3) Run time hour meter.
- l. Call to run relay circuit shall be full latching type relay to avoid float chatter.
4. Generator Control: The emergency generator shall provide back up power when normal power is lost and the pump control requires the lead pump to run. The generator shall remain running at least five minutes after control calls for pump stop. If after pump stops, normal power returns, the transfer switch shall return to normal position. If normal power does not return the generator shall shut down until pumps are called to run again. If normal power returns while pump is running transfer to normal shall be delayed until pump stops or 5 minutes elapse, which ever comes first.
5. Provide an auto dialer required for the following alarm conditions
 - a. High Wet Well Level
 - b. Pump Seal Failure
 - c. Pump Failure
 - d. Power Outage
6. Dialers: Acceptable manufacturers
 - a. See Section 16903

END OF SECTION

Project: R-2530B

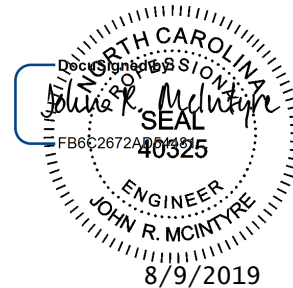
UC-91

County: Montgomery

PROJECT SPECIAL PROVISIONS
Utility Construction



John R. McIntyre, PE | Project Manager
140 Aqua Shed Court | Aberdeen, NC 28315 | 910-420-1437
rob@lkceengineering.com



Revise the 2018 Standard Specifications as follows:

Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:
add the following sentences:

The utility owner is the County of Montgomery. The contact person is Chris Hildreth and he can be reached by phone at 910-576-4221.

Page 15-2, Sub-article 1500-9 Placing Pipelines into Service
add the following sentence:

Obtain approval from the NCDEQ-Public Water Supply Section prior to placing a new water line into service. Use backflow prevention assemblies for temporary connections to isolate new water lines from existing water line.

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization
change the allowable leakage formula to:

$$W = LD\sqrt{P} \div 148,000$$

Page 15-6, Sub-article 1510-3 (B), Testing and Sterilization, sixth paragraph:
Replace the paragraph with the following:

Sterilize water lines in accordance with Section 1003 of The Rules Governing Public Water supply and AWWA C651 Section 4.4.3, the Continuous Feed Method. Provide a chlorine solution with between 50 parts per million and 100 parts per million in the initial feed. If the chlorine level drops below 10 parts per million during a 24 hour period, then flush, refill with fresh chlorine solution, and repeat for 24 hours. Provide certified bacteriological and contaminant test results from a state-approved or state-certified laboratory. Operate all valves and controls to assure thorough sterilization.

Project: R-2530B

UC-92

County: Montgomery

Page 15-7, Article 1510-4 MEASUREMENT AND PAYMENT, add the following paragraph after line 7:

The quantity of *Ductile Iron Water Pipe Fittings* will be measured and paid per pound based on the published weights for ductile iron fittings, exclusive of the weights of any accessories, as listed in the “DI Fittings Weight Chart” located at the NCDOT Utilities web site. If the Contractor elects to use compact ductile iron water pipe fittings, measurement will be based on the weight of standard size ductile iron water pipe fittings. Any fitting not listed will be measured based on the published weights for ductile iron fittings listed in ANSI/AWWA C-110/A21.10. This is limited to pressure pipe 4 inches or larger.

RESTRAINED JOINT DUCTILE IRON PIPE

Ductile Iron Pipe installed under this Contract shall utilize restrained joints installed as per manufacturer’s specifications.

This item includes furnishing all materials, equipment, and labor required to install restrained joint ductile iron pipe (including fittings), as specified and as shown on the Plans. The Contractor shall be responsible for installing the restrained joints in accordance with manufacturer's recommendations regarding assembly, deflection, and installation. Ductile iron pipe installation shall meet the requirements of AWWA Specification C 151 and ANSI Standard #A21-5.1. Ductile iron pipe shall be mechanical joint or push-on joint type. All joints for ductile iron pipe shall conform to the applicable dimensions and weights shown in the tables in AWWA C 151 and to ANSI A 21.11 (AWWA C 111) or latest revision.

WATER LINES

All PVC pipe installed 6” to 12” shall be AWWA C900 DR18.

All DIP pipe installed 6” to 12” shall be Ductile Iron Pressure Class 350

PROJECT SPECIAL PROVISIONS

Utilities by Others

Michael Baker
INTERNATIONAL

Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
Phone: 919-463-5488
Fax: 919-463-5490

General:

The following utility companies have facilities that will be in conflict with the construction of this project:

- A) Duke Energy – Power (Transmission)
- B) Duke Energy – Power (Distribution)
- C) City of Albemarle – Power (Distribution)
- D) Randolph EMC – Power (Distribution)
- E) AT&T – Communications
- F) Windstream – Communications
- G) CenturyLink – Communications
- H) Spectrum – Communications
- I) Piedmont Natural Gas – Gas Transmission
- J) Piedmont Natural Gas – Gas Distribution

The conflicting facilities of these concerns will be adjusted prior to the date of availability, unless otherwise noted and are therefore listed in these special provisions for the benefit of the Contractor. All utility work listed herein will be done by the utility owners. All utilities are shown on the plans from the best available information.

The Contractor's attention is directed to Article 105-8 of the 2018 Standard Specifications.

Utilities Requiring Adjustment:

Utility relocations are shown on the Utilities by Others Plans.

- A) Duke Energy – Power (Transmission)
 - 1) Duke Energy Transmission will have no conflicts with construction. Duke Energy would like it noted that the proposed rip rap embankment protection located at approximate station 362+50 through 364+00 Right of -L-, under the transmission lines, shall not be hauled in by any type of truck with a dump bed. All material located under the transmission lines shall be hauled in by methods that do not cause flash arc.

PROJECT SPECIAL PROVISIONS

Utilities by Others

- 2) Contact person for Duke Energy (Transmission) is Jamie Loy at 919-546-6034 or Jamie.Loy@duke-energy.com.
- B) Duke Energy – Power (Distribution)
- 1) Duke Energy will install a new pole at station 329+00 Left of -L-.
 - 2) Duke Energy will complete their relocation work by May 3, 2019.
 - 3) Contact person for Duke Energy is J.B. Jones at 919-481-6153 or jb.jones@duke-energy.com.
- C) City of Albemarle – Power (Distribution)
- 1) City of Albemarle will install new facilities from the beginning of the project to approximate station -L- 323+75.
 - 2) City of Albemarle will complete their relocation work by December 9, 2019.
 - 3) Contact person for City of Albemarle is Michael Leonas at 704-984-9605 or mleonas@ci.albemarle.nc.us.
- D) Randolph EMC – Power (Distribution)
- 1) Randolph EMC will install new facilities from approximate station -L- 350+00 through the end of the project limits.
 - 2) Randolph EMC will complete their relocation work by June 3, 2019.
 - 3) Contact person for Randolph EMC is Chub Little at 336-625-5177 or Chub.Little@randolphemc.com.
- E) AT&T – Communications
- 1) AT&T will abandon existing and install new buried facilities from the beginning of the project through approximate station -L-265+75.
 - 2) AT&T will complete their relocation work by September 30, 2019.
 - 3) Contact person for AT&T is Eric Allen at 704-413-5063 or ea5498@att.com.
- F) Windstream – Communications
- 1) Windstream will abandon existing facilities and install new facilities from the beginning of the project through approximate station -L- 332+00.
 - 2) Windstream will complete their relocation work by March 19, 2020.
 - 3) Contact person for Windstream is James Foley at 704-722-2822 or James.Foley@windstream.com.
- G) Centurylink – Communications
- 1) Centurylink will abandon existing and install new buried facilities from -Y16- (NC-73) through the end of the project limits.
 - 2) Centurylink will complete their relocation work by July 9, 2019.

PROJECT SPECIAL PROVISIONS

Utilities by Others

- 3) Contact person for Centurylink is Kevin Godwin at 910-366-2142 or Kevin.Godwin@centurylink.com.

H) Spectrum – Communications

- 1) Spectrum will abandon existing and install new facilities from the beginning of the project through approximate station -L- 329+75.
- 2) Spectrum will complete their relocation work by December 25, 2019.
- 3) Contact person for Spectrum is Louis Lee at 704-378-2241 or Louis.Lee@charter.com.

I) Piedmont Natural Gas – Gas (Transmission)

- 1) Piedmont Natural Gas will abandon existing and install new buried facilities at approximate station -L- 52+10.
- 2) Piedmont Natural Gas will complete their relocation work May 3, 2019.
- 3) Contact person for Piedmont Natural Gas is Aaron Weldon at 704-731-4153 or aaron.weldon@piedmontng.com.

J) Piedmont Natural Gas – Gas (Distribution)

- 1) Piedmont Natural Gas will abandon existing and install new buried facilities from the beginning of the project through -Y3- (Charter Street).
- 2) Piedmont Natural Gas will complete their relocation work by June 14, 2019.
- 3) Contact person for Piedmont Natural Gas is Kevin Thomas at 704-282-8479 or Kevin.Thomas@duke-energy.com.

**Project Special Provisions
Erosion Control**

STABILIZATION REQUIREMENTS:

(4-30-2019)

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

SEEDING AND MULCHING:

(West)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

Shoulder and Median Areas

August 1 - June 1

20#	Kentucky Bluegrass
75#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

20#	Kentucky Bluegrass
75#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
25#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 - September 1

100#	Tall Fescue
15#	Kentucky Bluegrass
30#	Hard Fescue
10#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Approved Tall Fescue Cultivars

06 Dust	Escalade	Justice	Serengeti
2 nd Millennium	Essential	Kalahari	Shelby
3 rd Millennium	Evergreen 2	Kitty Hawk 2000	Sheridan
Apache III	Falcon IV	Legitimate	Signia
Avenger	Falcon NG	Lexington	Silver Hawk
Barlexas	Falcon V	LSD	Sliverstar
Barlexas II	Faith	Magellan	Shenandoah Elite
Bar Fa	Fat Cat	Matador	Sidewinder
Barrera	Festnova	Millennium SRP	Skyline
Barrington	Fidelity	Monet	Solara
Barrobusto	Finelawn Elite	Mustang 4	Southern Choice II
Barvado	Finelawn Xpress	Ninja 2	Speedway
Biltmore	Finesse II	Ol' Glory	Spyder LS
Bingo	Firebird	Olympic Gold	Sunset Gold
Bizem	Firecracker LS	Padre	Taccoa
Blackwatch	Firenza	Patagonia	Tanzania
Blade Runner II	Five Point	Pedigree	Trio
Bonsai	Focus	Picasso	Tahoe II
Braveheart	Forte	Piedmont	Talladega
Bravo	Garrison	Plantation	Tarheel
Bullseye	Gazelle II	Proseeds 5301	Terrano
Cannavaro	Gold Medallion	Prospect	Titan Ltd
Catalyst	Grande 3	Pure Gold	Titanium LS
Cayenne	Greenbrooks	Quest	Tracer
Cessane Rz	Greenkeeper	Raptor II	Traverse SRP
Chipper	Gremlin	Rebel Exeda	Tulsa Time
Cochise IV	Greystone	Rebel Sentry	Turbo
Constitution	Guardian 21	Rebel IV	Turbo RZ
Corgi	Guardian 41	Regiment II	Tuxedo RZ
Corona	Hemi	Regenerate	Ultimate
Coyote	Honky Tonk	Rendition	Venture
Darlington	Hot Rod	Rhambler 2 SRP	Umbrella
Davinci	Hunter	Rembrandt	Van Gogh
Desire	Inferno	Reunion	Watchdog
Dominion	Innovator	Riverside	Wolfpack II
Dynamic	Integrity	RNP	Xtremegreen
Dynasty	Jaguar 3	Rocket	
Endeavor	Jamboree	Scorpion	

Approved Kentucky Bluegrass Cultivars:

4-Season	Blue Velvet	Gladstone	Quantum Leap
Alexa II	Blueberry	Granite	Rambo
America	Boomerang	Hampton	Rhapsody
Apollo	Brilliant	Harmonie	Rhythm
Arcadia	Cabernet	Impact	Rita
Aries	Champagne	Jefferson	Royce
Armada	Champlain	Juliet	Rubicon
Arrow	Chicago II	Jump Start	Rugby II
Arrowhead	Corsair	Keeneland	Shiraz
Aura	Courtyard	Langara	Showcase
Avid	Delight	Liberator	Skye
Award	Diva	Madison	Solar Eclipse
Awesome	Dynamo	Mercury	Sonoma
Bandera	Eagleton	Midnight	Sorbonne
Barduke	Emblem	Midnight II	Starburst
Barnique	Empire	Moon Shadow	Sudden Impact
Baroness	Envicta	Moonlight SLT	Total Eclipse
Barrister	Everest	Mystere	Touche
Barvette HGT	Everglade	Nu Destiny	Tsunami
Bedazzled	Excursion	NuChicago	Unique
Belissimo	Freedom II	NuGlade	Valor
Bewitched	Freedom III	Odyssey	Voyager II
Beyond	Front Page	Perfection	Washington
Blacksburg II	Futurity	Pinot	Zinfandel
Blackstone	Gaelic	Princeton 105	
Blue Note	Ginney II	Prosperity	

Approved Hard Fescue Cultivars:

Aurora II	Eureka II	Oxford	Scaldis II
Aurora Gold	Firefly	Reliant II	Spartan II
Berkshire	Granite	Reliant IV	Stonehenge
Bighorn GT	Heron	Rescue 911	
Chariot	Nordic	Rhino	

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding And Mulching**(West)**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation and/or trout stream construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

August 1 - June 1

18#	Creeping Red Fescue
8#	Big Bluestem
6#	Indiangrass
4#	Switchgrass
35#	Rye Grain
500#	Fertilizer
4000#	Limestone

May 1 – September 1

18#	Creeping Red Fescue
8#	Big Bluestem
6#	Indiangrass
4#	Switchgrass
25#	German or Browntop Millet
500#	Fertilizer
4000#	Limestone

Approved Creeping Red Fescue Cultivars:

Aberdeen

Boreal

Epic

Cindy Lou

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Measurement and Payment

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

FERTILIZER TOPDRESSING:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

MOWING:

The minimum mowing height on this project shall be six inches.

RESPONSE FOR EROSION CONTROL:**Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

Section	Erosion Control Item	Unit
1605	Temporary Silt Fence	LF
1606	Special Sediment Control Fence	LF/TON
1615	Temporary Mulching	ACR
1620	Seed - Temporary Seeding	LB
1620	Fertilizer - Temporary Seeding	TN
1631	Matting for Erosion Control	SY
SP	Coir Fiber Mat	SY
1640	Coir Fiber Baffles	LF
SP	Permanent Soil Reinforcement Mat	SY
1660	Seeding and Mulching	ACR
1661	Seed - Repair Seeding	LB

1661	Fertilizer - Repair Seeding	TON
1662	Seed - Supplemental Seeding	LB
1665	Fertilizer Topdressing	TON
SP	Safety/Highly Visible Fencing	LF
SP	Response for Erosion Control	EA

Construction Methods

Provide an approved subcontractor who performs an erosion control action as described in the NPDES Inspection Form SPPP30. Each erosion control action may include one or more of the above work items.

Measurement and Payment

Response for Erosion Control will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

Pay Item

Response for Erosion Control

Pay Unit

Each

ENVIRONMENTALLY SENSITIVE AREAS:

Description

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

Construction Methods

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only

clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-12 of the *Standard Specifications*.

(D) Seeding and Mulching

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

MINIMIZE REMOVAL OF VEGETATION:

The Contractor shall minimize removal of vegetation within project limits to the maximum extent practicable. Vegetation along stream banks and adjacent to other jurisdictional resources outside the construction limits shall only be removed upon approval of Engineer. No additional payment will be made for this minimization work.

STOCKPILE AREAS:

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

ACCESS AND HAUL ROADS:

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

CONSTRUCTION MATERIALS MANAGEMENT

(3-19-19) (rev. 04-27-19)

Description

The requirements set forth shall be adhered to in order to meet the applicable materials handling requirements of the NCG010000 permit. Structural controls installed to manage construction materials stored or used on site shall be shown on the E&SC Plan. Requirements for handling materials on construction sites shall be as follows:

Polyacrylamides (PAMS) and Flocculants

Polyacrylamides (PAMS) and flocculants shall be stored in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures designed to protect adjacent surface waters. PAMS or other flocculants used shall be selected from the NC DWR List of Approved PAMS/Flocculants. The concentration of PAMS and other flocculants used shall not exceed those specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. The NC DWR List of Approved PAMS/Flocculants is available at:

https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/ATU/ApprovedPAMS_4_1_2017.pdf

Equipment Fluids

Fuels, lubricants, coolants, and hydraulic fluids, and other petroleum products shall be handled and disposed of in a manner so as not to enter surface or ground waters and in accordance with applicable state and federal regulations. Equipment used on the site must be operated and maintained properly to prevent discharge of fluids. Equipment, vehicle, and other wash waters shall not be discharged into E&SC basins or other E&SC devices. Alternative controls should be provided such that there is no discharge of soaps, solvents, or detergents.

Waste Materials

Construction materials and land clearing waste shall be disposed of in accordance with North Carolina General Statutes, Chapter 130A, Article 9 - Solid Waste Management, and rules governing the disposal of solid waste (15A NCAC 13B). Areas dedicated for managing construction material and land clearing waste shall be at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. Paint and other liquid construction material waste shall not be dumped into storm drains. Paint and other liquid construction waste washouts should be located at least 50 away from storm drain inlets unless there is no alternative. Other options are to install lined washouts or use portable, removable bags or bins. Hazardous or toxic waste shall be managed in accordance with the federal Resource Conservation and Recovery Act (RCRA) and NC Hazardous Waste Rules at 15A NCAC, Subchapter 13A. Litter and sanitary waste shall be managed in a manner to prevent it from entering jurisdictional waters and shall be disposed of offsite.

Herbicide, Pesticide, and Rodenticides

Herbicide, pesticide, and rodenticides shall be stored and applied in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act, North Carolina Pesticide Law of 1971 and labeling restrictions.

Concrete Materials

Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. No concrete or cement slurry shall be discharged from the site. (Note that discharges from onsite concrete plants require coverage under a separate NPDES permit – NCG140000.) Concrete wash water shall be managed in accordance with the *Concrete Washout Structure* provision. Concrete slurry shall be managed and disposed of in accordance with *NCDOT DGS and HOS DCAR Distribution of Class A Residuals Statewide* (Permit No. WQ0035749). Any hardened concrete residue will be disposed of, or recycled on site, in accordance with state solid waste regulations.

Earthen Material Stock Piles

Earthen material stock piles shall be located at least 50 feet away from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available.

Measurement and Payment

Conditions set within the *Construction Materials Management* provision are incidental to the project for which no direct compensation will be made.

WASTE AND BORROW SOURCES:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

All offsite Staging Areas, Borrow and Waste sites shall be in accordance with "Borrow and Waste Site Reclamation Procedures for Contracted Projects" located at:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/fieldops/downloads/Files/ContractorReclamationProcedures.pdf

All forms and documents referenced in the "Borrow and Waste Site Reclamation Procedures for Contracted Projects" shall be included with the reclamation plans for offsite staging areas, and borrow and waste sites.

TEMPORARY DIVERSION:

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Article 1630-3 of the *Standard Specifications*.

CLEAN WATER DIVERSION:**Description**

This work consists of installing, maintaining, and removing any and all material required for the construction of clean water diversions. The clean water diversions shall be used to direct water flowing from offsite around/away from specific area(s) of construction.

Materials

Refer to Division 10

Item

Geotextile for Soil Stabilization, Type 4

Section

1056

Construction Methods

The Contractor shall install the clean water diversions in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the excavated material

shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Line clean water diversion with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope geotextile edge in a trench at least 5" deep and tamp securely. Make vertical overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile.

Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 6" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Stabilization of the excavated material will be paid for as *Temporary Seeding* as provided in Section 1620 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of the clean water diversions.

SAFETY FENCE AND JURISDICTIONAL FLAGGING:

Description

Safety Fence shall consist of furnishing materials, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary, or other boundaries located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland, endangered vegetation, culturally sensitive areas or water. The fence shall be installed prior to any land disturbing activities.

Interior boundaries for jurisdictional areas noted above shall be delineated by stakes and highly visible flagging.

Jurisdictional boundaries at staging areas, waste sites, or borrow pits, whether considered outside or interior boundaries shall be delineated by stakes and highly visible flagging.

Materials**(A) Safety Fencing**

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb/ft of length.

(B) Boundary Flagging

Wooden stakes shall be 4 feet in length with a minimum nominal 3/4" x 1-3/4" cross section. The flagging shall be at least 1" in width. The flagging material shall be vinyl and shall be orange in color and highly visible.

Construction Methods

No additional clearing and grubbing is anticipated for the installation of this fence. The fence shall be erected to conform to the general contour of the ground.

(A) Safety Fencing

Posts shall be set at a maximum spacing of 10 ft., maintained in a vertical position and hand set or set with a post driver. Posts shall be installed a minimum of 2 ft. into the ground. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence geotextile shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

Place construction stakes to establish the location of the safety fence in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for the staking of the safety fence. All stakeouts for safety fence shall be considered incidental to the work being paid for as "Construction Surveying", except that where there is no pay item for construction surveying, all safety fence stakeout will be performed by state forces.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

(B) Boundary Flagging

Boundary flagging delineation of interior boundaries shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Interior boundaries may be staked on a tangent that runs parallel to buffer but must not encroach on the buffer at any location. Interior boundaries of hand clearing shall be identified with a different colored flagging to distinguish it from mechanized clearing.

Boundary flagging delineation of interior boundaries will be placed in accordance with Article 105-9 or Article 801-1 of the *Standard Specifications*. No direct pay will be made for delineation of the interior boundaries. This delineation will be considered incidental to the work being paid for as *Construction Surveying*, except that where there is no pay item or construction surveying the cost of boundary flagging delineation shall be included in the unit prices bid for the various items in the contract. Installation for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall consist of wooden stakes on 25 feet maximum intervals with highly visible orange flagging attached. Stakes shall be installed a minimum of 6" into the ground. Additional flagging may be placed on overhanging vegetation to enhance visibility but does not substitute for installation of stakes.

Installation of boundary flagging for delineation of all jurisdictional boundaries at staging areas, waste sites, or borrow pits shall be performed in accordance with Subarticle 230-4(B)(5) or Subarticle 802-2(F) of the *Standard Specifications*. No direct pay will be made for this delineation, as the cost of same shall be included in the unit prices bid for the various items in the contract.

The Contractor shall be required to maintain alternative stakes and highly visible flagging in a satisfactory condition for the duration of the project as determined by the Engineer.

Measurement and Payment

Safety Fence will be measured and paid as the actual number of linear feet of polyethylene or polypropylene fence installed in place and accepted. Such payment will be full compensation including but not limited to furnishing and installing fence geotextile with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

Pay Item
Safety Fence

Pay Unit
Linear Foot

PERMANENT SOIL REINFORCEMENT MAT:**Description**

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

Property	Test Method	Value	Unit
Light Penetration	ASTM D6567	9	%
Thickness	ASTM D6525	0.40	in
Mass Per Unit Area	ASTM D6566	0.55	lb/sy
Tensile Strength	ASTM D6818	385	lb/ft
Elongation (Maximum)	ASTM D6818	49	%
Resiliency	ASTM D1777	>70	%
UV Stability *	ASTM D4355	≥80	%
Porosity (Permanent Net)	ECTC Guidelines	≥85	%
Maximum Permissible Shear	Performance Bench	≥8.0	lb/ft ²
Stress (Vegetated)	Test		
Maximum Allowable Velocity (Vegetated)	Performance Bench Test	≥16.0	ft/s

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification.

Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Permanent Soil Reinforcement Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

Pay Item

Permanent Soil Reinforcement Mat

Pay Unit

Square Yard

SKIMMER BASIN WITH BAFFLES:

Description

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing a geotextile spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Geotextile for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Temporary slope drain pipe at inlet of basin may be replaced by geotextile as directed. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4" and 12" in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillway with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for the primary spillway is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed

to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

___" *Skimmer* will be measured in units of each. ___" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___" *Skimmer* is considered incidental to the measurement of the quantity of ___" *Skimmer* and no separate payment will be made. No separate payment shall be made if ___" *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class ___ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item

___ " Skimmer
Coir Fiber Mat

Pay Unit

Each
Square Yard

TIERED SKIMMER BASIN WITH BAFFLES:

Description

Provide a tiered skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Tiered Skimmer Basin Detail sheet provided in the erosion control plans. Tiered Skimmer Basins shall be installed in areas where topography creates a large elevation difference between the inlet and outlet of a single skimmer basin. Work includes constructing sediment basins, installation of coir fiber baffles, installation of temporary slope drain pipe, furnishing, installation and cleanout of skimmer, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing geotextile spillway liners, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain pipe, coir fiber baffles, geotextile liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

Materials

Item	Section
Stone for Erosion Control, Class B	1042
Geotextile for Soil Stabilization, Type 4	1056
Fertilizer for Temporary Seeding	1060-2
Seed for Temporary Seeding	1060-4
Seeding and Mulching	1060-4
Matting for Erosion Control	1060-8
Staples	1060-8
Coir Fiber Mat	1060-14
Temporary Slope Drain	1622-2
Coir Fiber Baffle	1640

Provide appropriately sized and approved skimmer device.

Provide Schedule 40 PVC pipe with a length of 6 ft. to attach to the skimmer and the coupling connection to serve as the arm pipe. For skimmer sizes of 2.5 in. and smaller, the arm pipe diameter shall be 1.5 inches. For skimmer sizes of 3 in. and larger, refer to manufacturer recommendation.

Provide 4" diameter Schedule 40 PVC pipe to attach to coupling connection of skimmer to serve as the barrel pipe through the earthen dam.

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12" - 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1" - 2" long head at the top with a 1" - 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Excavate basins according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the primary spillways according to the Tiered Skimmer Basin Detail sheet in the erosion control plans. Construct the coir fiber baffles according to *Roadway Standard Drawings* No. 1640.01 and Section 1640 of the *Standard Specifications*. Multiple upper basins, or Modified Silt Basins Type 'B' as labeled on the detail, may be required based on site conditions and as directed.

Install skimmer device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin 1 ft. from the bottom of the basin and according to the detail, and extend the pipe so the basin will drain. Attach a 6 ft. arm pipe to the coupling connection and skimmer according to manufacturer recommendations. The coupling shall be rigid and non-buoyant and not exceed a diameter of 4" and 12" in length. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Clean out skimmer device when it becomes clogged with sediment and/or debris and is unable to float at the top of water in skimmer basin. Take appropriate measures to avoid ice

accumulation in the skimmer device. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line primary spillways with geotextile unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of geotextile in a trench at least 5" deep and tamp firmly. If geotextile for primary spillways is not one continuous piece of material, make horizontal overlaps a minimum of 18" with upstream geotextile overlapping the downstream geotextile. Secure geotextile with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the geotextile a maximum of 3 ft. horizontally and vertically. Geotextile shall be placed to the bottom and across the entire width of the basin according to the Tiered Skimmer Basin with Baffles detail.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart. Place sealant inside basin around barrel pipe on top of geotextile with a minimum width of 6 in.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3 of the *Standard Specifications*.

Measurement and Payment

Silt Excavation will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

Geotextile for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Coir Fiber Baffles will be measured and paid for in accordance with Article 1640-4 of the *Standard Specifications*.

___ " *Skimmer* will be measured in units of each. ___ " *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Barrel and arm pipe, cleanout, relocation and reinstallation of ___ " *Skimmer* is considered incidental to the measurement of the quantity of ___ " *Skimmer* and no separate payment will be made. No separate payment shall be made if ___ " *Skimmer*, barrel and/or arm pipe(s) are damaged by ice accumulation.

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

Temporary Slope Drain will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

Stone for Erosion Control, Class __ will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Seeding and Mulching will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

Seed for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Fertilizer for Temporary Seeding will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

Matting for Erosion Control will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item

__" Skimmer
Coir Fiber Mat

Pay Unit

Each
Square Yard

COIR FIBER WATTLES WITH POLYACRYLAMIDE (PAM):

Description

Coir Fiber Wattles are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber netting. Coir Fiber Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Coir Fiber Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of coir fiber wattles, matting installation, PAM application, and removing wattles.

Materials

Coir Fiber Wattle shall meet the following specifications:

100% Coir (Coconut) Fibers	
Minimum Diameter	12 in.
Minimum Density	3.5 lb/ft ³ +/- 10%
Net Material	Coir Fiber
Net Openings	2 in. x 2 in.
Net Strength	90 lbs.
Minimum Weight	2.6 lbs./ft. +/- 10%

Anchors: Stakes shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of Article 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

Coir Fiber Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install coir fiber wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with Article 1631-3 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the coir fiber wattle where the water is going to flow over at a rate of 2 ounces per wattle, and 1 ounce of PAM on matting on each side of the wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the coir fiber wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattles will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Coir Fiber Wattles*.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the coir fiber wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item

Polyacrylamide(PAM)
Coir Fiber Wattle

Pay Unit

Pound
Linear Foot

COIR FIBER WATTLE BARRIER:

(5-20-13)

1630

Description

Coir fiber wattle barriers are tubular products consisting of coir fibers (coconut fibers) encased in coir fiber or synthetic netting and used at the toe of fills or on slopes to intercept runoff. Coir fiber wattle barriers are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation, maintenance and removing coir fiber wattle barriers.

Materials

Coir fiber wattle shall meet the following specifications:

Inner Material	100% Coir (Coconut) Fibers
Minimum Diameter	18"
Minimum Length	10 ft.
Minimum Density	5 lb./c.f. \pm 10%
Net Material	Coir (Coconut) or Synthetic
Net Openings	2" x 2"
Net Strength	90 lb.
Minimum Weight	10 lb./ft. \pm 10%

Stakes shall be used as anchors. Provide hardwood stakes a minimum of 2-ft long with a 2" x 2" nominal square cross section. One end of the stake shall be sharpened or beveled to facilitate driving down into the underlying soil.

Provide staples made of 0.125" diameter new steel wire formed into a U-shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Align coir fiber wattle barriers in an overlapping and alternating pattern. Excavate a trench the entire length of each wattle with a depth of 2" to 3" for the wattle to be placed. Secure coir fiber wattle barriers to the soil by wire staples approximately every linear foot and at the end of each wattle. Install at least 4 stakes on the downslope side of the wattle with a maximum spacing of 2 linear feet and according to the detail. Install at least 2 stakes on the upslope side of the coir fiber wattle barriers according to the detail provided in the plans. Drive stakes into the ground at least 10" with no more than 2" projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

For coir fiber wattle barriers used to reduce runoff velocity for large slopes, use a maximum spacing of 25 ft. for the barrier measured along the slope.

Maintain the coir fiber wattle barriers until the project is accepted or until the coir fiber wattle barriers are removed, and remove and dispose of silt accumulations at the coir fiber wattle barriers when so directed in accordance with Section 1630 of the *Standard Specifications*.

Measurement and Payment

Coir Fiber Wattle Barrier will be measured and paid as the actual number of linear feet of coir fiber wattle barrier installed and accepted. Such price and payment will be full compensation for all work covered by this provision, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the coir fiber wattle barrier.

Payment will be made under:

Pay Item

Coir Fiber Wattle Barrier

Pay Unit

Linear Foot

TEMPORARY ROCK SILT CHECK TYPE A WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM):**Description**

Temporary Rock Silt Checks Type A with Excelsior Matting and Polyacrylamide (PAM) are devices utilized in temporary and permanent ditches to reduce runoff velocity and incorporate PAM into the construction runoff to increase settling of sediment particles and reduce turbidity of runoff. Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of Temporary Rock Silt Checks Type A, matting installation, PAM application, and removing Temporary Rock Silt Checks Type A with Excelsior Matting and PAM.

Materials

Structural stone shall be class B stone that meets the requirements of Section 1042 of the *Standard Specifications* for Stone for Erosion Control, Class B.

Sediment control stone shall be #5 or #57 stone, which meets the requirements of Section 1005 of the *Standard Specifications* for these stone sizes.

Matting shall meet the requirements of Excelsior Matting in Subarticle 1060-8(B) of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each Temporary Rock Silt Check Type A. The PAM product used shall be listed on the North Carolina Department of Environmental Quality Division of Water Resources web site as an approved PAM product for use in North Carolina.

Construction Methods

Temporary Rock Silt Checks Type A shall be installed in accordance with Subarticle 1633-3(A) of the *Standard Specifications*, Roadway Standard Drawing No. 1633.01 and the detail provided in the plans.

Installation of matting shall be in accordance with the detail provided in the plans, and anchored by placing Class B stone on top of the matting at the upper and lower ends.

Apply PAM at a rate of 4 ounces over the center portion of the Temporary Rock Silt Checks Type A and matting where the water is going to flow over. PAM applications shall be done during construction activities and after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM until the project is accepted or until the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM are removed, and shall remove and dispose of silt accumulations at the Temporary Rock Silt Checks Type A with Excelsior Matting and PAM when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

Measurement and Payment

Temporary Rock Silt Checks Type A will be measured and paid for in accordance with Article 1633-5 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Matting will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Polyacrylamide(PAM) will be measured and paid for by the actual weight in pounds of PAM applied to the Temporary Rock Silt Checks Type A. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

Pay Item	Pay Unit
Polyacrylamide(PAM)	Pound

IMPERVIOUS DIKE:

Description

This work consists of furnishing, installing, maintaining, and removing an *Impervious Dike* for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed.

Materials

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious geotextile.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

Measurement and Payment

Impervious Dike will be measured and paid as the actual number of linear feet of impervious dike(s) constructed, measured in place from end to end of each separate installation that has been completed and accepted. Such price and payment will be full compensation for all work including but not limited to furnishing materials, construction, maintenance, and removal of the impervious dike.

Payment will be made under:

Pay Item	Pay Unit
Impervious Dike	Linear Foot

TEMPORARY PIPE FOR CULVERT CONSTRUCTION:

Description

This work consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction.

Construction Methods

The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passageway for the stream through the work-site. The minimum size requirements will be as stated on the erosion control plans.

Measurement and Payment

___" *Temporary Pipe* will be measured and paid for at the contract unit price per linear foot of temporary pipe approved by the Engineer and measured in place from end to end. Such price and payment will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Payment will be made under:

Pay Item	Pay Unit
___" Temporary Pipe	Linear Foot

COIR FIBER MAT:**Description**

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed. Work includes providing all materials, excavating and backfilling, and placing and securing coir fiber mat with stakes, steel reinforcement bars or staples as directed.

Materials

Item	Section
Coir Fiber Mat	1060-14

Anchors: Stakes, reinforcement bars, or staples shall be used as anchors.

Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Construction Methods

Place the coir fiber mat immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris that will prevent the contact of the mat with the soil. Unroll the mat and apply without stretching such that it will lie smoothly but loosely on the soil surface.

For stream relocation applications, take care to preserve the required line, grade, and cross section of the area covered. Bury the top slope end of each piece of mat in a narrow trench at least 6 in. deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. overlap. Construct check trenches at least 12 in. deep every 50 ft. longitudinally along the edges of the mat or as directed. Fold over and bury mat to the full depth of the trench, close and tamp firmly. Overlap mat at least 6 in. where 2 or more widths of mat are installed side by side.

Place anchors across the mat at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the mat 3 ft. apart.

Adjustments in the trenching or anchoring requirements to fit individual site conditions may be required.

Measurement and Payment

Coir Fiber Mat will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for anchor items.

Payment will be made under:

Pay Item

Coir Fiber Mat

Pay Unit

Square Yard

FLOATING TURBIDITY CURTAIN:

Description

This work consists of furnishing a *Floating Turbidity Curtain* to deter silt suspension and movement of silt particles during construction. The floating turbidity curtain shall be constructed at locations as directed.

Materials

The curtain material shall be made of a tightly woven nylon, plastic or other non-deteriorating material meeting the following specifications:

Property	Value
Grab tensile strength	*md-370 lbs *cd-250 lbs
Mullen burst strength	480 psi
Trapezoid tear strength	*md-100 lbs *cd-60 lbs
Apparent opening size	70 US standard sieve
Percent open area	4% permittivity 0.28 sec-1

*md - machine direction

*cd - cross machine direction

In the event that more than one width of fabric is required, a 6" overlap of the material shall also be required.

The curtain material shall be supported by a flotation material having over 29 lbs/ft buoyancy. The floating curtain shall have a 5/16" galvanized chain as ballast and dual 5/16" galvanized wire ropes with a heavy vinyl coating as load lines.

Construction Methods

The Contractor shall maintain the *Floating Turbidity Curtain* in a satisfactory condition until its removal is requested by the Engineer. The curtain shall extend to the bottom of the jurisdictional resource. Anchor the curtain according to manufacturer recommendations.

Measurement and Payment

Floating Turbidity Curtain will be measured and paid for as the actual number of square yards of curtain furnished as specified and accepted. Such price and payment will be full compensation for the work as described in this section including but not limited to furnishing all materials, tools, equipment, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Floating Turbidity Curtain	Square Yard

CONCRETE WASHOUT STRUCTURE:

(12-05-16)

Description

Concrete washout structures are enclosures above or below grade to contain concrete waste water and associated concrete mix from washing out ready-mix trucks, drums, pumps, or other equipment. Concrete washouts must collect and retain all the concrete washout water and solids, so that this material does not migrate to surface waters or into the ground water. These enclosures are not intended for concrete waste not associated with wash out operations.

The concrete washout structure may include constructed devices above or below ground and or commercially available devices designed specifically to capture concrete waste water.

Materials

Item	Section
Temporary Silt Fence	1605

Safety Fence shall meet the specifications as provided elsewhere in this contract.

Geomembrane basin liner shall meet the following minimum physical properties for low permeability; it shall consist of a polypropylene or polyethylene 10 mil thick geomembrane. If the

minimum setback dimensions can be achieved the liner is not required. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Construction Methods

Build an enclosed earthen berm or excavate to form an enclosure in accordance with the details and as directed.

Install temporary silt fence around the perimeter of the enclosure in accordance with the details and as directed if structure is not located in an area where existing erosion and sedimentation control devices are capable to containing any loss of sediment.

Post a sign with the words “Concrete Washout” in close proximity of the concrete washout area, so it is clearly visible to site personnel. Install safety fence as directed for visibility to construction traffic.

The construction details for the above grade and below grade concrete washout structures can be found on the following web page link:

http://www.ncdot.gov/doh/operations/dp_chief_eng/roadside/soil_water/details/

Alternate details for accommodating concrete washout may be submitted for review and approval.

The alternate details shall include the method used to retain and dispose of the concrete waste water within the project limits and in accordance with the minimum setback requirements. (5 feet above groundwater, 50 feet from top of bank of perennial stream, other surface water body, or wetland.)

Maintenance and Removal

Maintain the concrete washout structure(s) to provide adequate holding capacity plus a minimum freeboard of 12 inches. Remove and dispose of hardened concrete and return the structure to a functional condition after reaching 75% capacity.

Inspect concrete washout structures for damage and maintain for effectiveness.

Remove the concrete washout structures and sign upon project completion. Grade the earth material to match the existing contours and permanently seed and mulch area.

Measurement and Payment

Concrete Washout Structure will be paid for per each enclosure installed in accordance with the details. If alternate details are approved then those details will also be paid for per each approved and installed device.

Temporary Silt Fence will be measured and paid for in accordance with Article 1605-5 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

Pay Item

Concrete Washout Structure

Pay Unit

Each

FABRIC INSERT INLET PROTECTION DEVICE (HIGH FLOW)

(6-29-17)

Description

This work shall consist of installing, maintaining, and removing *Fabric Insert Inlet Protection Device*, of the type specified, in inlet structures (catch basins, drop inlets, etc) in areas where asphalt or concrete may prevent the proper installation of a Rock Inlet Sediment Traps Type C, or as directed.

Materials

The product shall be a fabric inlet protection device composed of a fitted woven polypropylene geotextile double sewn with nylon thread suspended sack. The *Fabric Insert Inlet Protection Device* shall be manufactured to fit the opening of the catch basin or drop inlet or shall have a deflector to direct runoff from the curb opening into the fabric sack. The *Fabric Insert Inlet Protection Device* shall have a rigid frame or support system to support the loaded weight of the product. The product shall have lifting loops for removing the device from the basin and will have dump straps attached at the bottom to facilitate the emptying of the device. The *Fabric Insert Inlet Protection Device* shall have an overflow system to allow stormwater to enter the inlet structure and avoid ponding on the roadway when the device reaches capacity

The stitching shall meet the following physical properties:

Physical	Test Method	English
Average Wide Width Strength	ASTM D-4884	165 lb/in

The fitted filter assembly shall have the following physical properties:

Physical	Test Method	English
Grab Tensile	ASTM D-4632	255 x 275 lbs
Minimum Puncture Strength	ASTM D-4833	125 lbs
Mullen Burst	ASTM D-3786	420 PSI
Minimum UV Resistance	ASTM D-4355	70 %.
Flow Rate	ASTM D-4491	200 gal/min/ft ²
Apparent Opening	ASTM D-4751	20 US Sieve
Permittivity	ASTM D-4491	1.5 sec ⁻¹

Construction Methods

Strictly comply with manufacturer's installation instructions and recommendations. Maintenance shall include regular daily inspections and after each qualifying rain event. The *Fabric Insert Inlet Protection Device* shall be emptied, cleaned and placed back into the basin when it reaches 50% capacity or as directed.

Measurement and Payment

This work will be paid for at the contract unit price per *Fabric Insert Inlet Protection Device* of the type specified, complete in place and accepted. Such payment shall be full compensation for furnishing and installing the *Fabric Insert Inlet Protection Device* in accordance with this specification and for all required maintenance.

Maintenance of the device, cleanout and disposal of accumulated sediments shall be paid for by *Fabric Insert Inlet Protection Device Cleanout*.

Payment will be made under:

Pay Item	Pay Unit
Fabric Insert Inlet Protection Device	Each
Fabric Insert Inlet Protection Device Cleanout	Each

R-2530B

SW-1

Stanly County

FILTRATION BASIN**SECTION 01 GENERAL**

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

Furnish all labor, equipment and materials required to complete all work associated with installing Stormwater Structures, as described within these Technical Specifications and as shown within the Plans and Details. Due to the nature of the work required by this Contract, it is anticipated that the quantity and location of Stormwater Structures to be constructed may change due to the actual conditions that occur during the construction of the project. The type, location, and quantity of structures may be increased or decreased as determined by the Engineer or Engineer's Consultant. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of work.

The Contractor shall perform all work as shown on the Plans and Details in accordance with the applicable NCDOT Standard Specifications and ASTM standards.

Stone found on-site and approved by the Engineer or Engineer's Consultant will be used to the extent feasible, and when meeting the minimum requirements of the rocks and boulders specified within the Plans and Details.

SECTION 02 FILTRATION RISER OUTLET STRUCTURE

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

- i. The work covered by this section consists of construction and maintenance of a riser outlet structure located within the Filtration areas as shown within the Plans and Details. The Riser Outlet Structure for Filtration area SCM1 is designed to outfall to a proposed ditch. The Riser Outlet Structure for Filtration area SCM2 outfalls to a dissipater pad and then to an existing channel. Construction of the Riser Outlet Structure will include installation of the stormwater precast junction box sections and joints, trash rack, capped drawdown orifice, under drain connection, anti-flotation device, and emergency drain and water tight connection to the proposed outlet pipe and inlet pipes as shown within the Plans and Details.
- ii. The Riser Outlet Structure will be affected by the actual conditions that occur during the construction of the project. The quantity of Riser Outlet Structure may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.
- iii. The Riser Outlet Structure associated with the Filtration Area shall be measured as described in Masonry Drainage Structures, NCDOT Standard Specifications for Roads and Structures Section 840.

R-2530B

SW-2

Stanly County

B. Submittals:

- i. Contractor shall provide three (3) copies of the shop drawings or product data of the Riser Outlet Structure and any associated components to be installed to Owner's Representative for approval by Engineer.
- ii. No construction shall commence until all shop drawings and product sheets are received and approved.
- iii. Shop drawings shall include a plan and cross-section schematic of the proposed Riser Outlet Structure installation with dimensions and components shown.

C. Materials:

- i. Riser Outlet Structure - shall meet the necessary ASTM standards for a Precast concrete structure of this nature, NCDOT Standard Specification Section 1077, and shall meet the necessary dimensions noted in the "Riser Structure" detail in the Plans and Details.
- ii. 3" PVC Emergency Drain - shall be constructed and be sized per the details within the Plans and Details. Deviations from the Plans and Details shall be approved by the Engineer prior to installation.
- iii. Drainage Structure Steps – shall conform to Detail 840.66
- iv. Removable Trash Rack – shall be constructed and be sized per the details within the Plans and Details. Deviations from the Plans and Details shall be approved by the Engineer prior to installation.
- v. Anti-flotation Device concrete – shall meet the requirements of the Special Provisions Section 06 Cast-in-Place Structural Concrete.

D. Construction Methods: Riser Outlet Structure shall be constructed according to the details shown in the Plans and Details or as directed by the Engineer. Riser Outlet Structure should be located as noted in the Plans and Details. Ensure that the Riser Outlet Structure is extended into the ground to the indicated depth below the invert elevation to accommodate the anti-flotation structure for the Riser Outlet Structure. Install capped orifice and trash rack as shown in the Plans and Details.

E. Basis of Payment: The Riser Outlet Structure associated with the Filtration Area shall conform to a Masonry Drainage Structure described in Section 840 - Minor Drainage Structures, of the NCDOT Standard Specifications for Roads and Structures and paid for as *Filtration Basin #___*.

R-2530B

SW-3

Stanly County

SECTION 03 FILTRATION AREA

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

- i. The work covered by this section consists of layout, demolition, construction and maintenance of the Filtration Area as shown within the Plans and Details.
- ii. Construction of the Filtration Area shall include the installation of the outlet structure, under drain system, forebay, filter fabric, and Filtration soil mixture as shown within the Plans and Details.
- iii. Excavation associated with the Filtration Area shall be measured in Cubic yards and follow the standards for Grading as described in Section 225 - Unclassified Excavation of the NCDOT Standard Specifications for Roads and Structures.
- iv. Filtration area soil mixture shall not be installed until all areas draining to the Filtration Area have been stabilized with vegetation (90% vegetative coverage). Contractor shall stabilize perimeter of Filtration Area with silt fence until site is stabilized.
- v. Sod and mulch used for coverage of the Filtration Area shall be cleaned of fines prior to installation.
- vi. Refer to the Plans and Details for additional requirements.

B. Submittals:

- i. Contractor shall provide three (3) copies of a soil properties report for the Filtration soil mix to be used for installation within the Filtration Areas. Soil properties report shall be provided to the Owner's Representative for approval by Engineer.
- ii. No construction shall commence until all shop drawings and product sheets are received and approved.

C. Materials:

- i. Filtration Soil Mixture – All fill within the Filtration Area shall conform to the soil mixture as specified in the Plans and Details. The percentages indicated shall be based on volume as opposed to weight.
- ii. Under drain system
 - a. Perforated 6-inch under drain pipe – pipe with 3/8-inch perforations at 6-inches on center and 4 holes per row. Meeting the requirements as described within the details of the Plans and Details and Special Provisions Section 04.

R-2530B

SW-4

Stanly County

- b. Non-perforated 6-inch PVC – outlet pipe for under drain system meeting the requirements as described within the Plans and Details and Special Provisions Section 04.
 - c. 6-inch PVC Cleanout – capped, white, UV-resistant cleanout pipe for under drain system meeting the requirements as described within the Plans and Details, Special Provisions Section 04 and the NCDOT Standard Section 1044-6.
 - d. Cleanout caps are encased with 18" x 18" x 6" Concrete Collar per the details in the Plans and Details. Concrete Collars shall meet the requirements of the Section 06 Cast-in-Place Structural Concrete, and be constructed per the details in the Plans and Details.
 - e. #57 stone and #8 stone shall meet the specifications of the Structural Stone Section, Special Provisions Section 05.
- iii. Geotextile for Drainage and Class B Rip Rap – to be utilized in conjunction with the Forebay. Class B Rip Rap shall be paid for and meet the requirements of Section 876 – Rip Rap, of the NCDOT Standard Specifications for Roads and Structures, and be constructed per the Plans and Details.

D. Construction Methods: Refer to the Plans and Details for the location and extents of the Filtration Area and its associated structures.

E. Basis of Payment:

- i. The quantity of materials will be paid for as a part of *Filtration Basin #__*. The above process and payment will be full compensation for all materials, labor, equipment, and incidentals necessary to install the Filtration Area materials.

SECTION 04 DRAINAGE PIPE

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General: Where shown in the Plans and Details the Contractor may use Reinforced Concrete Pipe, HDPE Pipe, or PVC pipe in accordance with the following requirements.

B. Material:

Item	NCDOT Section
Polyvinyl-Chloride (PVC)	1044
Elbows	1044

C. Construction Methods:

- i. Pipe Culverts shall be installed in accordance with the Plans and Details, and NCDOT Standard Specification 300 Pipe Installation.

R-2530B

SW-5

Stanly County

- ii. Where allowed by the Plans and Details, use any of the several alternate pipes shown herein, but only one type of pipe and elbow will be permitted between drainage structures or for the entire length of a pipe.

D. Basis of Payment: The quantity of materials will be paid for as a part of *Filtration Basin* #__.

SECTION 05 STRUCTURE STONE

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

- i. This section describes the Structure Stone materials that will be utilized to construct rip rap channels, Filtration area forebays, Filtration area, and under drain system.

Class I and Class B Rip-Rap associated with the Filtration Area shall be paid for as described in Section 876 – Rip Rap, of the NCDOT Standard Specifications for Roads.

- ii. The quantity of stone to be installed will be affected by the actual conditions that occur during the construction of the project. The quantity of stone may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

B. Materials:

Structure stone used on this project is described as meeting NCDOT Standards and Specifications as listed below, but similar stone may be used as approved by Engineer.

Item	NCDOT Section
#8 Stone	1005
#57 Stone	1005

Stone found onsite and meeting the site requirement shown above and as indicated in the plans can be used to the extent feasible during construction. Stone used in this manner shall be approved by the engineer prior to installation.

- C. Construction Methods:** The Contractor shall place stone in locations and to the thickness, widths, and lengths as shown on the Plans and Details or as directed by the Engineer. All stone shall be placed to form sediment and erosion control devices, stormwater structures, and/or a channel lining neatly and uniformly with an even surface in accordance with the contract and shall meet the approval of the Engineer.

D. Method of Measurements:

Stone used in Stormwater Structures will be measured for payment under this section. The quantity of Structure Stone to be paid for will be the actual number of tons of Structure Stone that has been incorporated into the work, or has been delivered to and stockpiled on the

R-2530B

SW-6

Stanly County

project as directed by the Engineer. Structure Stone that has been stockpiled will not be measured a second time. The Structure Stone will be measured by being weighed in trucks on certified platform scales or other certified weighing devices.

Refer to Sections 1005 and 1044 of the NCDOT Standards and Specifications for stone measurements

E. Basis of Payment

Such price and measurement will be full compensation for all work covered by this section, including but not limited to furnishing, weighing, stockpiling, re-handling, placing, and maintaining the stone and disposal of any materials not incorporated into the project if directed by the Engineer. The quantity of materials will be paid for as a part of *Filtration Basin #__*.

SECTION 06 CAST-IN-PLACE STRUCTURAL CONCRETE

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

- i. This section describes the Cast-in-Place Structural Concrete that will be utilized to construct the Stormwater Structures (anti-floatation device concrete, concrete collars, etc.).
- ii. The quantity of Cast-in-Place Structural Concrete to be installed will be affected by the actual conditions that occur during the construction of the project. The quantity of Cast-in-Place Structural Concrete may be increased, decreased, or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

B. Materials:

1. Concrete shall have a minimum compressive strength of 4,000 PSI at 28 days and shall be installed in accordance with the latest revision to ACI-318 building code requirements for reinforced concrete. Concrete shall have a minimum compressive strength at 2 days of 3000 PSI before water may be released over the structure.
2. Concrete shall have a 3" to 5" slump.
3. Concrete mix design is required to be submitted to the Engineer for his review. It is to be noted that the concrete supplier shall have a quality control for the production of all concrete, which must be acceptable to the engineer and meets current ACF standards. Contractor shall also submit concrete curing method to the Engineer for his review.
4. Reinforcing bars shall be ASTM-A615 GRADE 60 and be detailed in accordance with the latest revision to the ACI detailing manual. All shop drawings pertaining to rebar details shall be submitted to the Engineer for his review.

R-2530B

SW-7

Stanly County

5. Test cylinders shall be molded and laboratory cured in accordance with ASTM C31. Four cylinders shall be taken for each day's concrete placement. Cylinders shall be tested in accordance with the latest revision to ASTM C39.
6. Chamfer all exposed external corners of concrete with 3/4" x 45° chamfer, unless otherwise noted.
7. Mechanical vibration of all concrete is required unless otherwise directed by Engineer. Consolidate placed concrete with mechanical vibrating equipment and procedures recommended by ACI 309R.
8. Concrete formwork is to remain in place for at least 24 hours and be stripped within 48 hours. Unless otherwise noted, formed concrete surfaces shall have a smooth finish. Contractor shall submit repair details for areas with flaws before repairs are made.

C. Method of Measurement: No separate measurement for payment purposes will be made for this work.

D. Basis of Payment: There will be no separate payment for Cast-in-place Structural Concrete. Payment shall be made under the unit or lump sum cost of the structure that "Cast-in-place" Structural Concrete is utilized to construct.

SECTION 07 FILTRATION SOIL MIXTURE

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

Furnish and place Filtration Soil Mixture (FSM) with no organic material, clay, loam, dust and similar adherent materials as shown in the Plans and Details as directed.

B. Materials:

Filtration soil mixture shall consist of the following blend:

Recycled Expanded Slate Fines	80%
Approved Compost Organic Component	20%

The slate aggregate fines and organic component consist of the following:

Recycled Expanded Slate Fines

The recycled expanded slate aggregate fines shall conform to the following screening operation:

R-2530B

SW-8

Stanly County

Sieve Size	% Retained
#4	4-8%
#8	28-38%
#16	46-58%
#30	63-75%
#50	74-84%
#100	82-90%
Fine Material	2.79-3.53% passing #100

Organic Component

The compost or organic component shall conform to the following specifications:

1. Humus material shall have an ash content of no less than 8 percent and no more than 40 percent.
2. The pH of the organic matter shall be between 5.5 and 8.5.
3. The salt content shall be less than 10 millimho/cm at 25 degrees C, (Ece<10 dS/m) on a saturated paste extract.
4. Types of acceptable composted products can be derived from yard wastes, low in salts, low in phosphorus (P205 below 1% wet weight basis), free from weed seeds, free of pathogens and other deleterious materials.
5. Composted pine bark products are conditionally acceptable (stable humus must be present).
6. Sludge-based materials are not acceptable including municipal sewage sludge bio-solids.
7. The organic amendment must have a Carbon/Nitrogen ratio of <25:1.
8. The compost shall be aerobic without malodorous presence of decomposition products.
9. From 75 to 100 percent organic amendment particles shall pass the 4.0 mm sieve size.
10. From 45 to 65 percent moisture measured via wet-weight basis.
11. Free of stones, debris, plant material.
12. Organic content must be above 50% on a dry weight basis.
13. Metals and contaminants must meet or exceed US EPA Standard 40.

Mixing

The FSM components shall be thoroughly mechanically mixed at 1 part compost with 4 parts of expanded slate fines until a uniform distribution of the components is achieved. The process for mixing shall be submitted in writing to the Engineer prior to mixing. An on-site inspection of the mixing procedure may be required prior to approval of the mixing process. No samples shall be prepared prior to receiving approval of the mixing process.

Testing

The Contractor will be responsible for ensuring that the FSM meets the material requirements presented herein. Prior to placement of the FSM, the Contractor will submit a report demonstrating that the FSM meets the material requirements. Random samples may

R-2530B

SW-9

Stanly County

be taken by the Engineer in order to test for mix uniformity and to verify that it remains within the specified ranges for the physical properties. The FSM shall not be placed until approved by the Engineer.

Stockpiling

If the FSM is to be stockpiled, the location chosen for stockpiling shall be reasonably free of weed seed, vegetation, toxic substances, or any other material which would be harmful to plant growth. Prior to stockpiling, the Engineer shall approve the stockpile location.

C. Construction:

The filtration facility shall not be constructed until all contributing drainage areas are stabilized as shown on the Plans and Details and to the satisfaction of the Engineer. No heavy equipment shall operate within the perimeter of a filtration facility during excavation, underdrain placement, backfilling, planting, or mulching of the facility.

Excavation

The filtration facility shall be excavated to the dimensions, side slopes, and elevations shown on the plans. The method of excavation shall minimize the compaction of the bottom of the filtration facility (the 'rake' method of working the bucket should be used). Prior to placing the underdrain and the FSM, the bottom of the excavation shall be tilled to a minimum depth of 12 inches to alleviate any compaction of the facility bottom.

Placement and Compaction of the Engineered Soil Media

The FSM shall be placed and graded using low ground-contact pressure equipment or by excavators and/or backhoes operating on the ground adjacent to the filtration facility. The FSM shall be placed in horizontal layers not to exceed 12 inches for the entire area of the filtration facility. The FSM shall be compacted by saturating the entire area of the filtration facility after each lift of FSM is placed until water flows from the underdrain. Water for saturation shall be applied by spraying or sprinkling. Saturation of each lift shall be performed in the presence of the Engineer. An appropriate sediment control device shall be used to treat any sediment-laden water discharged from the underdrain. If the FSM becomes contaminated during the construction of the facility, the contaminated material shall be removed and replaced with uncontaminated material. Final grading of the FSM shall be performed after a 24-hour settling period. Final elevation shall be within 1 inch of the elevation shown on the plans.

- D. Basis of Payment:** The quantity of materials, measured per the unit price below, will be paid for as a part of *Filtration Basin #__*. The above process and payments will be full compensation for all materials, labor, equipment, and incidentals necessary to install the Filtration Area materials.

R-2530B

SW-10

Stanly County

SECTION 08 POLYPROPYLENE NONWOVEN GEOTEXTILE FABRIC

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

This work consists of furnishing and placing polypropylene nonwoven geotextile fabric of the type specified, over previously prepared areas as directed.

B. Materials:

The product shall be a nonwoven polypropylene geotextile and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. The mat shall have the following physical properties:

Property	Test Method	Value	Unit
Tensile Strength (Grab)	ASTM D4632	120	lbs
Elongation	ASTM D4632	≥50	%
CBR Puncture	ASTM D6241	300	lbs
Trapezoidal Tear	ASTM D4533	40	lbs
UV Resistance	ASTM D4355	50	%
Apparent Opening Size (AOS)	ASTM D4751	60	US Std. Sieve
Permittivity	ASTM D4491	1.10	sec-1
Water Flow Rate	ASTM D4491	110	gpm/ft2

Provide Type 1, Type 2 or Type 4 material certification in accordance with Article 106-3 for geosynthetics.

C. Construction:**(A) Preparation**

Prepare surfaces on which polypropylene nonwoven geotextile fabric is to be placed to smooth condition as indicated or as directed by the Engineer. Remove debris, depressions, and obstructions that could damage the polypropylene nonwoven geotextile fabric.

(B) Installation

Polypropylene nonwoven geotextile fabric shall be installed at the proper elevation and alignment as shown on the Plans and Details or as directed by the Engineer.

Successive sheets of polypropylene nonwoven geotextile fabric shall be overlapped a minimum of 12 inches, with the upstream sheet overlapping the downstream sheet. All seams shall be subject to the approval of the Engineer. Should the polypropylene nonwoven geotextile fabric be damaged during installation or engineered soil placement, a geotextile patch shall be placed over the damaged area extending beyond the damaged area a minimum distance of 12 inches, or the specified seam overlap, whichever is greater.

Placement of engineered soil, as applicable, should proceed immediately following placement of the polypropylene nonwoven geotextile fabric. The polypropylene nonwoven geotextile fabric should be covered with a minimum of 12 inches of

R-2530B

SW-11

Stanly County

loosely placed engineered soil. Select construction equipment that will prevent excess rutting.

On side slopes, anchor polypropylene nonwoven geotextile fabric at top, then unroll. Keep polypropylene nonwoven geotextile fabric free of wrinkles and folds.

Cut polypropylene nonwoven geotextile fabric using upward cutting hook blade.

Use sandbags or other weights to prevent wind displacement.

(C) Protection

Atmospheric exposure of the polypropylene nonwoven geotextile fabric to the elements following lay down shall be limited to 14 days to prevent damage.

Vehicles and construction equipment shall not be operated directly over installed polypropylene nonwoven geotextile fabric without approval of the Engineer.

- D. Basis of Payment:** The quantity of materials, measured per the unit price below, will be paid for as a part of *Filtration Basin #*____. The above process and payments will be full compensation for all materials, labor, equipment, and incidentals necessary to install the geotextile fabric.

SECTION 09 FILTRATION BASINS

7/25/2019

KIMLEY-HORN AND ASSOCIATES, INC.

A. General:

The work covered by this section consists of all elements of work covered by Sections 01 thru 08, except that the requirements of the above-referenced sections pertaining to measurement and payment will not apply unless specific reference is made to such.

B. Construction:

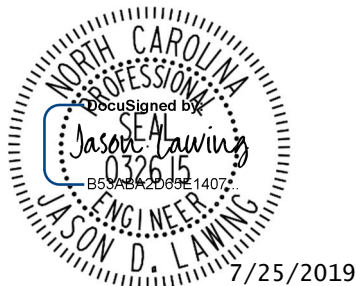
Perform the work in accordance with Sections 01 thru 08.

C. Measurement and Payment:

*Filtration Basin #*____ will be paid at the contract lump sum price. No separate payment will be made for any items in Sections 01 thru 08 as such work will be incidental to the work covered by this section.

Payment will be made under:

Filtration Basin #____.....Lump Sum (LS)



R-2530B

SW-12

Stanly County

SANDBAGS:**Description**

Furnish and place sandbags at hazardous spill basin and filtration basin locations in accordance with the Plans and Details and as directed. Sandbags are intended for use only in the case of an emergency of a hazardous spill. In such a situation, the sandbags will be moved into place to block the basin outlet such that the normal free flow of runoff at the basin outlet can be interrupted to cause containment of hazardous runoff.

Materials

Sandbags shall meet the characteristics and requirements per the Federal Commercial Item Description A-A-52140A. Use Class III select material to fill acrylic sandbags.

Stockpiling

The location chosen for stockpiling shall not be located within the basin, shall be in close proximity to the outfall of the basin, shall be within Right-of-Way (ROW) or Permanent Drainage Easement (PDE), shall not block the outfall or impede the normal flow of runoff from the basin and shall not be inside the roadway clear recovery area. Prior to stockpiling, the Engineer shall approve the stockpile location.

Construction Methods

Sandbags shall be constructed per the Federal Commercial Item Description A-A-52140A. The number of sandbags required at each basin is provided in the Plans and Details.

Measurement and Payment

The quantity of materials, measured per the unit price below, will be paid for as *Sandbags*. The above process and payments will be full compensation for all materials, labor, equipment, and incidentals necessary to install the sandbags.

Payment will be made under:

Sandbags.....Each (EA)



7/25/2019

R-2530B

SW-13

Stanly County

IMPERVIOUS PLASTIC FOR SPILL BASIN:

Place Impervious plastic in spill basin in accordance with the Plans and Details and as directed by the Engineer.

Material Requirements

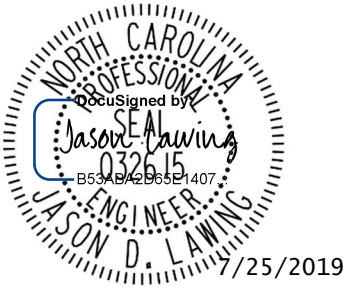
Appearance	Black
Thickness, Nominal	10 mil
Weight	47 lbs/MSF
1” Tensile Strength	36 lbf
Elongation at Break	800%
Tear Resistance	6 lbf
Trapezoid Tear	33 lbf
Hydrostatic Resistance	57 psi
Maximum Use Temperature	180°F
Minimum Use Temperature	-70°F

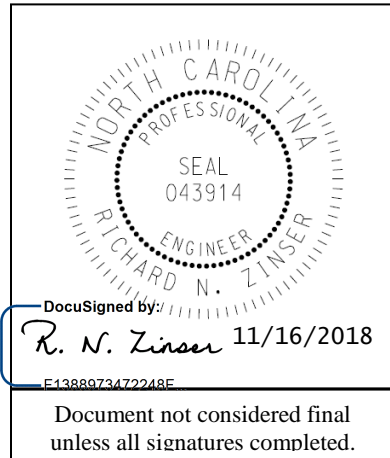
Measurement and Payment

Impervious Plastic will be measured and paid for in square yards that are completed and accepted. The price and payment will be full compensation for furnishing, hauling, placing, and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Impervious Plastic	Square Yards





**Signals and Intelligent Transportation Systems
Project Special Provisions
(Version 18.2)**

*Prepared By: RNZ
16-Nov-18*

Contents

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES.....	3
1.1. GENERAL REQUIREMENTS – CONSTRUCTION METHODS (1700-3(K))	3
1.2. WOOD POLES – CONSTRUCTION METHODS (1720-3)	3
2. SIGNAL HEADS.....	3
2.1. MATERIALS	3
A. General:.....	3
B. Vehicle Signal Heads:.....	5
C. Pedestrian Signal Heads:	8
D. Signal Cable:	9
3. CONTROLLERS WITH CABINETS	10
3.1. MATERIALS – GENERAL CABINETS	10
3.2. MATERIALS – TYPE 170E CABINETS	11
A. Type 170 E Cabinets General:.....	11
B. Type 170 E Cabinet Electrical Requirements:.....	11
C. Type 170 E Cabinet Physical Requirements:.....	19
D. Model 2018 Enhanced Conflict Monitor:	21
E. Preemption and Sign Control Box	31
3.3. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS	34
3.4. MATERIALS – TYPE 2070E CONTROLLERS	34
4. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS	34
4.1. DESCRIPTION	34
4.2. MATERIALS	34
A. General:.....	34
B. Loop Emulator System:.....	36
C. Video Imaging Loop Emulator System Support:.....	37
4.3. CONSTRUCTION METHODS	38
4.4. MEASUREMENT AND PAYMENT	38
5. TRAFFIC SIGNAL SUPPORTS.....	39
5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES	39
A. General:.....	39
B. Materials:	41
C. Construction Methods:	42
5.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS)	43
A. Materials:	43
B. Construction Methods:	44
5.3. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES.....	44
A. Description:	45
B. Soil Test and Foundation Determination:	45

C.	Drilled Pier Construction:.....	48
5.4.	POLE NUMBERING SYSTEM	48
A.	New Poles	48
5.5.	MEASUREMENT AND PAYMENT	48
6.	BACK PULL FIBER OPTIC CABLE	48
6.1.	DESCRIPTION	48
6.1.	CONSTRUCTION	48
6.2.	MEASUREMENT AND PAYMENT	49

1. 2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES

The 2018 Standard Specifications are revised as follows:

1.1. GENERAL REQUIREMENTS – Construction Methods (1700-3(K))

Page 17-4, revise sentence starting on line 14 to read “Modify existing electrical services, as necessary, to meet the grounding requirements of the NEC, these *Standard Specifications*, *Standard Drawings*, and the project plans.”

Page 17-4, revise sentence beginning on line 21 to read “Furnish and install additional ground rods to grounding electrode system as necessary to meet the *Standard Specifications*, *Standard Drawings*, and test requirements.”

1.2. WOOD POLES – Construction Methods (1720-3)

Page 17-18, revise sentence starting on line 13 to read “On new Department-owned poles, install a grounding system consisting of #6 AWG solid bare copper wire that is mechanically crimped using an irreversible compression tool with die to a single ground rod installed at base of pole or to the electrical service grounding electrode system located within 10 feet of the pole.”

2. SIGNAL HEADS

2.1. MATERIALS

A. General:

Fabricate vehicle signal head housings and end caps from die-cast aluminum. Fabricate 12-inch and 16-inch pedestrian signal head housings and end caps from die-cast aluminum. Fabricate 9-inch pedestrian signal head housings, end caps, and visors from virgin polycarbonate material. Provide visor mounting screws, door latches, and hinge pins fabricated from stainless steel. Provide interior screws, fasteners, and metal parts fabricated from stainless steel.

Fabricate tunnel and traditional visors from sheet aluminum.

Paint all surfaces inside and outside of signal housings and doors. Paint outside surfaces of tunnel and traditional visors, wire outlet bodies, wire entrance fitting brackets and end caps when supplied as components of messenger cable mounting assemblies, pole and pedestal mounting assemblies, and pedestrian pushbutton housings. Have electrostatically-applied, fused-polyester paint in highway yellow (Federal Standard 595C, Color Chip Number 13538) a minimum of 2.5 to 3.5 mils thick. Do not apply paint to the latching hardware, rigid vehicle signal head mounting brackets for mast-arm attachments, messenger cable hanger components or balance adjuster components.

Have the interior surfaces of tunnel and traditional visors painted an alkyd urea black synthetic baking enamel with a minimum gloss reflectance and meeting the requirements of MIL-E-10169, “Enamel Heat Resisting, Instrument Black.”

Where required, provide polycarbonate signal heads and visors that comply with the provisions pertaining to the aluminum signal heads listed on the QPL with the following exceptions:

Fabricate signal head housings, end caps, and visors from virgin polycarbonate material. Provide UV stabilized polycarbonate plastic with a minimum thickness of 0.1 ± 0.01 inches that is highway yellow (Federal Standard 595C, Color Chip 13538). Ensure the color is incorporated into the plastic material before molding the signal head housings and end caps. Ensure the plastic

formulation provides the following physical properties in the assembly (tests may be performed on separately molded specimens):

Test	Required	Method
Specific Gravity	1.17 minimum	ASTM D 792
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength, yield, PSI	8500 minimum	ASTM D 638
Izod impact strength, ft-lb/in [notched, 1/8 inch]	12 minimum	ASTM D 256

For pole mounting, provide side of pole mounting assemblies with framework and all other hardware necessary to make complete, watertight connections of the signal heads to the poles and pedestals. Fabricate the mounting assemblies and frames from aluminum with all necessary hardware, screws, washers, etc. to be stainless steel. Provide mounting fittings that match the positive locking device on the signal head with the serrations integrally cast into the brackets. Provide upper and lower pole plates that have a 1 ¼-inch vertical conduit entrance hubs with the hubs capped on the lower plate and 1 ½-inch horizontal hubs. Ensure that the assemblies provide rigid attachments to poles and pedestals so as to allow no twisting or swaying of the signal heads. Ensure that all raceways are free of sharp edges and protrusions, and can accommodate a minimum of ten Number 14 AWG conductors.

For pedestal mounting, provide a post-top slipfitter mounting assembly that matches the positive locking device on the signal head with serrations integrally cast into the slipfitter. Provide stainless steel hardware, screws, washers, etc. Provide a minimum of six 3/8 X 3/4-inch long square head bolts for attachment to pedestal. Provide a center post for multi-way slipfitters.

For light emitting diode (LED) traffic signal modules, provide the following requirements for inclusion on the Department's Qualified Products List for traffic signal equipment.

1. Sample submittal,
2. Third-party independent laboratory testing results for each submitted module with evidence of testing and conformance with all of the Design Qualification Testing specified in section 6.4 of each of the following Institute of Transportation Engineers (ITE) specifications:
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement
 - Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement
 - Pedestrian Traffic Control Signal Indications –Light Emitting Diode (LED) Signal Modules.

(Note: The Department currently recognizes two approved independent testing laboratories. They are Intertek ETL Semko and Light Metrics, Incorporated with Garwood Laboratories. Independent laboratory tests from other laboratories may be considered as part of the QPL submittal at the discretion of the Department,

3. Evidence of conformance with the requirements of these specifications,
4. A manufacturer's warranty statement in accordance with the required warranty, and

5. Submittal of manufacturer's design and production documentation for the model, including but not limited to, electrical schematics, electronic component values, proprietary part numbers, bill of materials, and production electrical and photometric test parameters.
6. Evidence of approval of the product to bear the Intertek ETL Verified product label for LED traffic signal modules.

In addition to meeting the performance requirements for the minimum period of 60 months, provide a written warranty against defects in materials and workmanship for the modules for a period of 60 months after installation of the modules. During the warranty period, the manufacturer must provide new replacement modules within 45 days of receipt of modules that have failed at no cost to the State. Repaired or refurbished modules may not be used to fulfill the manufacturer's warranty obligations. Provide manufacturer's warranty documentation to the Department during evaluation of product for inclusion on Qualified Products List (QPL).

B. Vehicle Signal Heads:

Comply with the ITE standard "Vehicle Traffic Control Signal Heads". Provide housings with provisions for attaching backplates.

Provide visors that are 8 inches in length for 8-inch vehicle signal head sections. Provide visors that are 10 inches in length for 12-inch vehicle signal heads.

Provide a termination block with one empty terminal for field wiring for each indication plus one empty terminal for the neutral conductor. Have all signal sections wired to the termination block. Provide barriers between the terminals that have terminal screws with a minimum Number 8 thread size and that will accommodate and secure spade lugs sized for a Number 10 terminal screw.

Mount termination blocks in the yellow signal head sections on all in-line vehicle signal heads. Mount the termination block in the red section on five-section vehicle signal heads.

Furnish vehicle signal head interconnecting brackets. Provide one-piece aluminum brackets less than 4.5 inches in height and with no threaded pipe connections. Provide hand holes on the bottom of the brackets to aid in installing wires to the signal heads. Lower brackets that carry no wires and are used only for connecting the bottom signal sections together may be flat in construction.

For messenger cable mounting, provide messenger cable hangers, wire outlet bodies, balance adjusters, bottom caps, wire entrance fitting brackets, and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the messenger cable. Fabricate messenger cable hanger components, wire outlet bodies and balance adjuster components from stainless steel or malleable iron galvanized in accordance with ASTM A153 (Class A) or ASTM A123. Provide serrated rings made of aluminum. Provide messenger cable hangers with U-bolt clamps. Fabricate washers, screws, hex-head bolts and associated nuts, clevis pins, cotter pins, U-bolt clamps and nuts from stainless steel.

For mast-arm mounting, provide rigid vehicle signal head mounting brackets and all other hardware necessary to make complete, watertight connections of the vehicle signal heads to the mast arms and to provide a means for vertically adjusting the vehicle signal heads to proper alignment. Fabricate the mounting assemblies from aluminum, and provide serrated rings made of aluminum. Provide stainless steel cable attachment assemblies to secure the brackets to the mast arms. Ensure all fastening hardware and fasteners are fabricated from stainless steel.

Provide LED vehicular traffic signal modules (hereafter referred to as modules) that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are aluminum indium gallium phosphorus (AlInGaP) technology for red and yellow indications and indium gallium nitride (InGaN) for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to +165°F. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

For the modules, provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Tint the red, yellow and green lenses to correspond with the wavelength (chromaticity) of the LED. Transparent tinting films are unacceptable. Provide a lens that is integral to the unit with a smooth outer surface.

1. LED Circular Signal Modules:

Provide modules in the following configurations: 12-inch circular sections, and 8-inch circular sections. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red circular	17	11
8-inch red circular	13	8
12-inch green circular	15	15
8-inch green circular	12	12

For yellow circular signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to insure power required at 77° F is 22 Watts or less for the 12-inch circular module and 13 Watts or less for the 8-inch circular module.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

2. LED Arrow Signal Modules

Provide 12-inch omnidirectional arrow signal modules. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the requirements for 12-inch omnidirectional modules specified in the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement" dated July 1, 2007 (hereafter referred to as VTCSH Arrow Supplement) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Arrow Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red arrow	12	9
12-inch green arrow	11	11

For yellow arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Arrow Supplement to insure power required at 77° F is 12 Watts or less.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of an arrow traffic signal module. Power may also be derived from voltage, current and power factor measurements.

3. LED U-Turn Arrow Signal Modules:

Provide modules in the following configurations: 12-inch left u-turn arrow signal modules and 12-inch right u-turn arrow signal modules.

Modules are not required to be listed on the ITS and Signals Qualified Products List. Provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement" dated June 27, 2005 (hereafter referred to as VTCSH Circular Supplement) and other requirements stated in this specification.

Provide modules that have minimum maintained luminous intensity values that are not less than 16% of the values calculated using the method described in section 4.1 of the VTCSH Circular Supplement.

Provide modules that meet the following requirements when tested under the procedures outlined in the VTCSH Circular Supplement:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
12-inch red u-turn arrow	17	11
12-inch green u-turn arrow	15	15

For yellow u-turn arrow signal modules, provide modules tested under the procedures outlined in the VTCSH Circular Supplement to ensure power required at 77° F is 22 Watts or less.

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

C. Pedestrian Signal Heads:

Provide pedestrian signal heads with international symbols that meet the MUTCD. Do not provide letter indications.

Comply with the ITE standard for “Pedestrian Traffic Control Signal Indications” and the following sections of the ITE standard for “Vehicle Traffic Control Signal Heads” in effect on the date of advertisement:

- Section 3.00 - “Physical and Mechanical Requirements”
- Section 4.01 - “Housing, Door, and Visor: General”
- Section 4.04 - “Housing, Door, and Visor: Materials and Fabrication”
- Section 7.00 - “Exterior Finish”

Provide a double-row termination block with three empty terminals and number 10 screws for field wiring. Provide barriers between the terminals that accommodate a spade lug sized for number 10 terminal screws. Mount the termination block in the hand section. Wire all signal sections to the terminal block.

Where required by the plans, provide 16-inch pedestrian signal heads with traditional three-sided, rectangular visors, 6 inches long. Where required by the plans, provide 12-inch pedestrian signal heads with traditional three-sided, rectangular visors, 8 inches long.

Provide 2-inch diameter pedestrian push-buttons with weather-tight housings fabricated from die-cast aluminum and threading in compliance with the NEC for rigid metal conduit. Provide a weep hole in the housing bottom and ensure that the unit is vandal resistant.

Provide push-button housings that are suitable for mounting on flat or curved surfaces and that will accept 1/2-inch conduit installed in the top. Provide units that have a heavy duty push-button assembly with a sturdy, momentary, normally-open switch. Have contacts that are electrically insulated from the housing and push-button. Ensure that the push-buttons are rated for a minimum of 5 mA at 24 volts DC and 250 mA at 12 volts AC.

Provide standard R10-3 signs with mounting hardware that comply with the MUTCD in effect on the date of advertisement. Provide R10-3E signs for countdown pedestrian heads and R10-3B for non-countdown pedestrian heads.

Design the LED pedestrian traffic signal modules (hereafter referred to as modules) for installation into standard pedestrian traffic signal sections that do not contain the incandescent signal section reflector, lens, eggcrate visor, gasket, or socket. Provide modules that consist of an assembly that uses LEDs as the light source in lieu of an incandescent lamp. Use LEDs that are of the latest aluminum indium gallium phosphorus (AlInGaP) technology for the Portland Orange hand and countdown displays. Use LEDs that are of the latest indium gallium nitride (InGaN) technology for the Lunar White walking man displays. Install the ultra-bright type LEDs that are rated for 100,000 hours of continuous operation from -40°F to $+165^{\circ}\text{F}$. Design modules to have a minimum useful life of 60 months and to meet all parameters of this specification during this period of useful life.

Design all modules to operate using a standard 3 - wire field installation. Provide spade terminals crimped to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard pedestrian signal housing. Do not provide other types of crimped terminals with a spade adapter.

Ensure the power supply is integral to the module assembly. On the back of the module, permanently mark the date of manufacture (month & year) or some other method of identifying date of manufacture.

Provide modules in the following configuration: 16-inch displays which have the solid hand/walking man overlay on the left and the countdown on the right, and 12-inch displays which have the solid hand/walking man module as an overlay. All makes and models of LED modules purchased for use on the State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

Provide the manufacturer's model number and the product number (assigned by the Department) for each module that appears on the 2018 or most recent Qualified Products List. In addition, provide manufacturer's certification in accordance with Article 106-3 of the *Standard Specifications*, that each module meets or exceeds the ITE "Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Signal Modules" dated August 04, 2010 (hereafter referred to as PTCSI Pedestrian Standard) and other requirements stated in this specification.

Provide modules that meet the following requirements when tested under the procedures outlined in the PTCSI Pedestrian Standard:

Module Type	Max. Wattage at 165° F	Nominal Wattage at 77° F
Hand Indication	16	13
Walking Man Indication	12	9
Countdown Indication	16	13

Note: Use a wattmeter having an accuracy of $\pm 1\%$ to measure the nominal wattage and maximum wattage of a circular traffic signal module. Power may also be derived from voltage, current and power factor measurements.

Provide module lens that is hard coated or otherwise made to comply with the material exposure and weathering effects requirements of the Society of Automotive Engineers (SAE) J576. Ensure all exposed components of the module are suitable for prolonged exposure to the environment, without appreciable degradation that would interfere with function or appearance.

Ensure the countdown display continuously monitors the traffic controller to automatically learn the pedestrian phase time and update for subsequent changes to the pedestrian phase time.

Ensure the countdown display begins normal operation upon the completion of the preemption sequence and no more than one pedestrian clearance cycle.

D. Signal Cable:

Furnish 16-4 and 16-7 signal cable that complies with IMSA specification 20-1 except provide the following conductor insulation colors:

- For 16-4 cable: white, yellow, red, and green

- For 16-7 cable: white, yellow, red, green, yellow with black stripe tracer, red with black stripe tracer, and green with black stripe tracer. Apply continuous stripe tracer on conductor insulation with a longitudinal or spiral pattern.

Provide a ripcord to allow the cable jacket to be opened without using a cutter. IMSA specification 19-1 will not be acceptable. Provide a cable jacket labeled with the IMSA specification number and provide conductors constructed of stranded copper.

3. CONTROLLERS WITH CABINETS

3.1.MATERIALS – GENERAL CABINETS

Provide a moisture resistant coating on all circuit boards.

Provide one 20 mm diameter radial lead UL-recognized metal oxide varistor (MOV) between each load switch field terminal and equipment ground. Electrical performance is outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20μs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20μs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide a power line surge protector that is a two-stage device that will allow connection of the radio frequency interference filter between the stages of the device. Ensure that a maximum continuous current is at least 10A at 120V. Ensure that the device can withstand a minimum of 20 peak surge current occurrences at 20,000A for an 8x20 microsecond waveform. Provide a maximum clamp voltage of 395V at 20,000A with a nominal series inductance of 200μH. Ensure that the voltage does not exceed 395V. Provide devices that comply with the following:

Frequency (Hz)	Minimum Insertion Loss (dB)
60	0
10,000	30
50,000	55
100,000	50
500,000	50
2,000,000	60
5,000,000	40
10,000,000	20
20,000,000	25

3.2. MATERIALS – TYPE 170E CABINETS

A. Type 170 E Cabinets General:

Conform to the city of Los Angeles' Specification No. 54-053-08, *Traffic Signal Cabinet Assembly Specification* (dated July 2008), except as required herein.

Furnish model 336S pole mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details. Provide 336S pole mounted cabinets that are 46" high with 40" high internal rack assemblies.

Furnish model 332 base mounted cabinets configured for 8 vehicle phases, 4 pedestrian phases, and 6 overlaps. When overlaps are required, provide auxiliary output files for the overlaps. Do not reassign load switches to accommodate overlaps unless shown on electrical details.

Provide model 200 load switches, model 222 loop detector sensors, model 252 AC isolators, and model 242 DC isolators according to the electrical details. As a minimum, provide one (1) model 2018 conflict monitor, one (1) model 206L power supply unit, two (2) model 204 flashers, one (1) DC isolator (located in slot I14), and four (4) model 430 flash transfer relays (provide seven (7) model 430 flash transfer relays if auxiliary output file is installed) with each cabinet.

B. Type 170 E Cabinet Electrical Requirements:

Provide a cabinet assembly designed to ensure that upon leaving any cabinet switch or conflict monitor initiated flashing operation, the controller starts up in the programmed start up phases and start up interval.

Furnish two sets of non-fading cabinet wiring diagrams and schematics in a paper envelope or container and placed in the cabinet drawer.

All AC+ power is subject to radio frequency signal suppression.

Provide surge suppression in the cabinet for each type of cabinet device. Provide surge protection for the full capacity of the cabinet input file. Provide surge suppression devices that

operate properly over a temperature range of -40° F to +185° F. Ensure the surge suppression devices provide both common and differential modes of protection.

Provide a pluggable power line surge protector that is installed on the back of the PDA (power distribution assembly) chassis to filter and absorb power line noise and switching transients. Ensure the device incorporates LEDs for failure indication and provides a dry relay contact closure for the purpose of remote sensing. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20μs).....20,000A
Occurrences (8x20μs waveform).....10 minimum @ 20,000A
Maximum Clamp Voltage.....395VAC
Operating Current.....15 amps
Response Time.....< 5 nanoseconds

Provide a loop surge suppressor for each set of loop terminals in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (6 times, 8x20μs)
(Differential Mode).....400A
(Common Mode).....1,000A
Occurrences (8x20μs waveform).....500 min @ 200A
Maximum Clamp Voltage
(Differential Mode @400A).....35V
(Common Mode @1,000A).....35V
Response Time.....< 5 nanoseconds
Maximum Capacitance.....35 pF

Provide a data communications surge suppressor for each communications line entering or leaving the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20μs).....10,000A
Occurrences (8x20μs waveform).....100 min @ 2,000A
Maximum Clamp Voltage.....Rated for equipment protected
Response Time.....< 1 nanosecond
Maximum Capacitance.....1,500 pF
Maximum Series Resistance.....15Ω

Provide a DC signal surge suppressor for each DC input channel in the cabinet. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20 μ s).....10,000A
Occurrences (8x20 μ s waveform).....100 @ 2,000A
Maximum Clamp Voltage.....30V
Response Time.....< 1 nanosecond

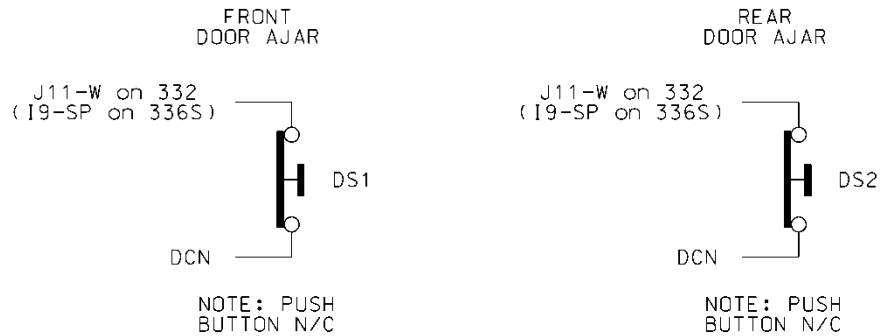
Provide a 120 VAC signal surge suppressor for each AC+ interconnect signal input. Ensure the device meets the following specifications:

Peak Surge Current (Single pulse, 8x20 μ s).....20,000A
Maximum Clamp Voltage.....350VAC
Response Time.....< 200 nanoseconds
Discharge Voltage.....<200 Volts @ 1,000A
Insulation Resistance..... \geq 100 M Ω

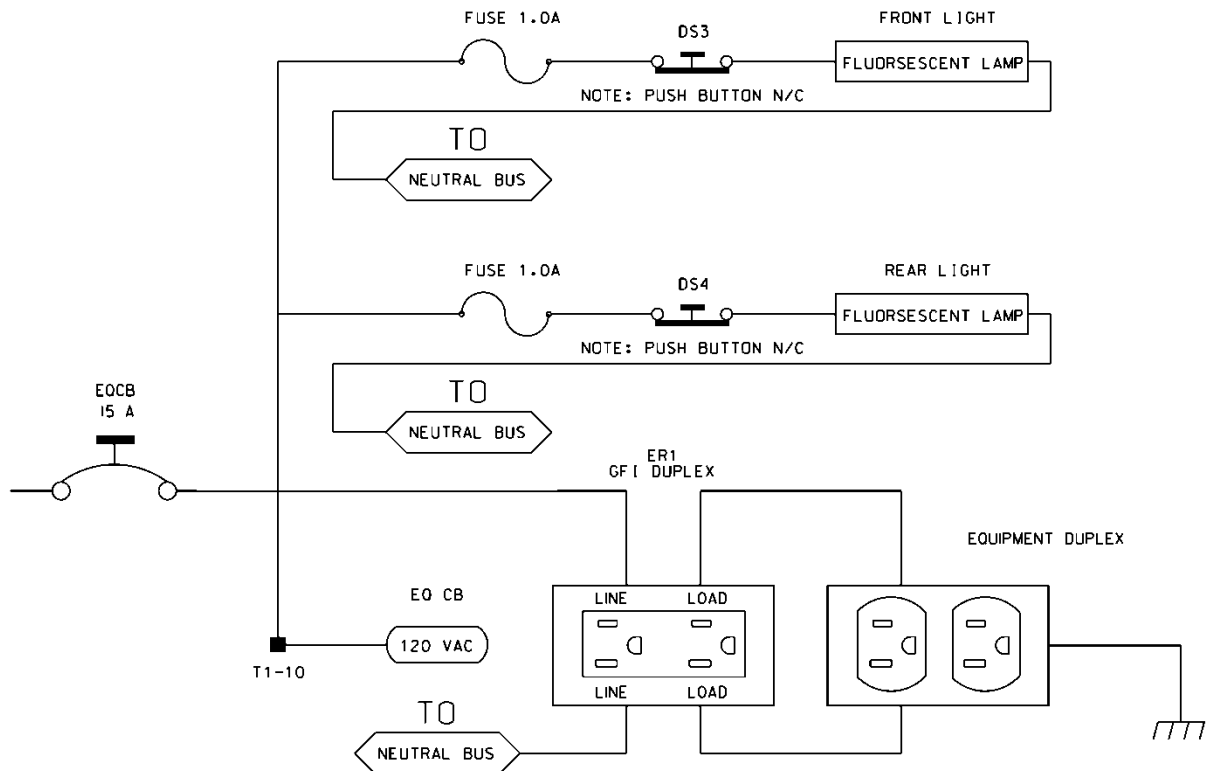
Provide conductors for surge protection wiring that are of sufficient size (ampacity) to withstand maximum overcurrents which could occur before protective device thresholds are attained and current flow is interrupted.

If additional surge protected power outlets are needed to accommodate fiber transceivers, modems, etc., install a UL listed, industrial, heavy-duty type power outlet strip with a minimum rating of 15 A / 125 VAC, 60 Hz. Provide a strip that has a minimum of 3 grounded outlets. Ensure the power outlet strip plugs into one of the controller unit receptacles located on the rear of the PDA. Ensure power outlet strip is mounted securely; provide strain relief if necessary.

Provide a door switch in the front and a door switch in the rear of the cabinet that will provide the controller unit with a Door Ajar alarm when either the front or the rear door is open. Ensure the door switches apply DC ground to the Input File when either the front door or the rear door is open.



Furnish a fluorescent fixture in the rear across the top of the cabinet and another fluorescent fixture in the front across the top of the cabinet at a minimum. Ensure that the fixtures provide sufficient light to illuminate all terminals, labels, switches, and devices in the cabinet. Conveniently locate the fixtures so as not to interfere with a technician's ability to perform work on any devices or terminals in the cabinet. Provide a protective diffuser to cover exposed bulbs. Install 16 watt T-4 lamps in the fluorescent fixtures. Provide a door switch to provide power to each fixture when the respective door is open. Wire the fluorescent fixtures to the 15 amp ECB (equipment circuit breaker).



Furnish a police panel with a police panel door. For model 336S cabinets, mount the police panel on the rear door. Ensure that the police panel door permits access to the police panel when the main door is closed. Ensure that no rainwater can enter the cabinet even with the police panel door open. Provide a police panel door hinged on the right side as viewed from the front. Provide a police panel

door lock that is keyed to a standard police/fire call box key. In addition to the requirements of LA Specification No. 54-053-08, provide the police panel with a toggle switch connected to switch the intersection operation between normal stop-and-go operation (AUTO) and manual operation (MANUAL). Ensure that manual control can be implemented using inputs and software such that the controller provides full programmed clearance times for the yellow clearance and red clearance for each phase while under manual control.

Provide a 1/4-inch locking phone jack in the police panel for a hand control to manually control the intersection. Provide sufficient room in the police panel for storage of a hand control and cord.

Ensure the 336S cabinet Input File is wired as follows:

336S Cabinet														
Port-Bit/C-1 Pin Assignment														
Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13	14
C-1 (Spares)	59	60	61	62	63	64	65	66	75	76	77	78	79	80
Port	3-2	1-1	3-4	1-3	3-1	1-2	3-3	1-4	2-5	5-5	5-6	5-1	5-2	6-7
C-1	56	39	58	41	55	40	57	42	51	71	72	67	68	81
Port	2-1	1-5	2-3	1-7	2-2	1-6	2-4	1-8	2-6	5-7	5-8	5-3	5-4	6-8
C-1	47	43	49	45	48	44	50	46	52	73	74	69	70	82

For model 332 base mounted cabinets, ensure terminals J14-E and J14-K are wired together on the rear of the Input File. Connect TB9-12 (J14 Common) on the Input Panel to T1-2 (AC-) on the rear of the PDA.

Provide detector test switches mounted at the top of the cabinet rack or other convenient location which may be used to place a call on each of eight phases based on the chart below. Provide three positions for each switch: On (place call), Off (normal detector operation), and Momentary On (place momentary call and return to normal detector operation after switch is released). Ensure that the switches are located such that the technician can read the controller display and observe the intersection.

Connect detector test switches for cabinets as follows:

336S Cabinet		332 Cabinet	
Detector Call Switches	Terminals	Detector Call Switches	Terminals
Phase 1	I1-F	Phase 1	I1-W
Phase 2	I2-F	Phase 2	I4-W
Phase 3	I3-F	Phase 3	I5-W
Phase 4	I4-F	Phase 4	I8-W
Phase 5	I5-F	Phase 5	J1-W
Phase 6	I6-F	Phase 6	J4-W
Phase 7	I7-F	Phase 7	J5-W
Phase 8	I8-F	Phase 8	J8-W

Provide the PCB 28/56 connector for the conflict monitor unit (CMU) with 28 independent contacts per side, dual-sided with 0.156 inch contact centers. Provide the PCB 28/56 connector contacts with solder eyelet terminations. Ensure all connections to the PCB 28/56 connector are soldered to the solder eyelet terminations.

Ensure that all cabinets have the CMU connector wired according to the 332 cabinet connector pin assignments (include all wires for auxiliary output file connection). Wire pins 13, 16, R, and U of the CMU connector to a separate 4 pin plug, P1, as shown below. Provide a second plug, P2, which will mate with P1 and is wired to the auxiliary output file as shown below. Provide an additional plug, P3, which will mate with P1 and is wired to the pedestrian yellow circuits as shown below. When no auxiliary output file is installed in the cabinet, provide wires for the green and yellow inputs for channels 11, 12, 17, and 18, the red inputs for channels 17 and 18, and the wires for the P2 plug. Terminate the two-foot wires with ring type lugs, insulated, and bundled for optional use.

PIN	P1		P2		P3	
	FUNCTION	CONN TO	FUNCTION	CONN TO	FUNCTION	CONN TO
1	CH-9G	CMU-13	OLA-GRN	A123	2P-YEL	114
2	CH-9Y	CMU-16	OLA-YEL	A122	4P-YEL	105
3	CH-10G	CMU-R	OLB-GRN	A126	6P-YEL	120
4	CH-10Y	CMU-U	OLB-YEL	A125	8P-YEL	111

Do not provide the P20 terminal assembly (red monitor board) or red interface ribbon cable as specified in LA Specification No. 54-053-08.

Provide a P20 connector that mates with and is compatible with the red interface connector mounted on the front of the conflict monitor. Ensure that the P20 connector and the red interface

connector on the conflict monitor are center polarized to ensure proper connection. Ensure that removal of the P20 connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Wire the P20 connector to the output file and auxiliary output file using 22 AWG stranded wires. Ensure the length of these wires is a minimum of 42 inches in length. Provide a durable braided sleeve around the wires to organize and protect the wires.

Wire the P20 connector to the traffic signal red displays to provide inputs to the conflict monitor as shown below. Ensure the pedestrian Don't Walk circuits are wired to channels 13 through 16 of the P20 connector. When no auxiliary output file is installed in the cabinet, provide wires for channels 9 through 12 reds. Provide a wire for special function 1. Terminate the unused wires with ring type lugs, insulated, and bundled for optional use.

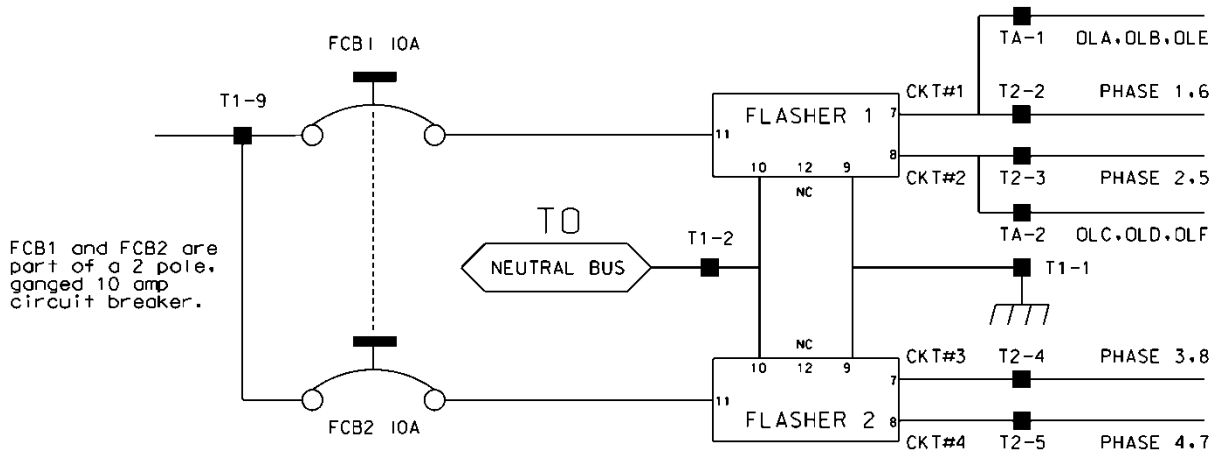
P20 Connector					
PIN	FUNCTION	CONN TO	PIN	FUNCTION	CONN TO
1	Channel 15 Red	119	2	Channel 16 Red	110
3	Channel 14 Red	104	4	Chassis GND	01-9
5	Channel 13 Red	113	6	N/C	
7	Channel 12 Red	AUX 101	8	Spec Function 1	
9	Channel 10 Red	AUX 124	10	Channel 11 Red	AUX 114
11	Channel 9 Red	AUX 121	12	Channel 8 Red	107
13	Channel 7 Red	122	14	Channel 6 Red	134
15	Channel 5 Red	131	16	Channel 4 Red	101
17	Channel 3 Red	116	18	Channel 2 Red	128
19	Channel 1 Red	125	20	Red Enable	01-14

Ensure the controller unit outputs to the auxiliary output file are pre-wired to the C5 connector. When no auxiliary output file is installed in the cabinet, connect the C5 connector to a storage socket located on the Input Panel or on the rear of the PDA.

Do not wire pin 12 of the load switch sockets.

In addition to the requirements of LA Specification No. 54-053-08, ensure relay K1 on the Power Distribution Assembly (PDA) is a four pole relay and K2 on the PDA is a two pole relay.

Provide a two pole, ganged circuit breaker for the flash bus circuit. Ensure the flash bus circuit breaker is an inverse time circuit breaker rated for 10 amps at 120 VAC with a minimum of 10,000 RMS symmetrical amperes short circuit current rating. Do not provide the auxiliary switch feature on the flash bus circuit breaker. Ensure the ganged flash bus circuit breaker is certified by the circuit breaker manufacturer to provide gang tripping operation.



Ensure auxiliary output files are wired as follows:

AUXILIARY OUTPUT FILE TERMINAL BLOCK TA ASSIGNMENTS	
POSITION	FUNCTION
1	Flasher Unit #1, Circuit 1/FTR1 (OLA, OLB)/FTR3 (OLE)
2	Flasher Unit #1, Circuit 2/FTR2 (OLC, OLD)/FTR3 (OLF)
3	Flash Transfer Relay Coils
4	AC -
5	Power Circuit 5
6	Power Circuit 5
7	Equipment Ground Bus
8	NC

Provide four spare load resistors mounted in each cabinet. Ensure each load resistor is rated as shown in the table below. Wire one side of each load resistor to AC-. Connect the other side of each resistor to a separate terminal on a four (4) position terminal block. Mount the load resistors and terminal block either inside the back of Output File No. 1 or on the upper area of the Service Panel.

ACCEPTABLE LOAD RESISTOR VALUES	
VALUE (ohms)	WATTAGE
1.5K – 1.9 K	25W (min)
2.0K – 3.0K	10W (min)

Provide Model 200 load switches, Model 204 flashers, Model 242 DC isolators, Model 252 AC isolators, and Model 206L power supply units that conform to CALTRANS' *"Transportation Electrical Equipment Specifications"* dated March 12, 2009 with Erratum 1.

C. Type 170 E Cabinet Physical Requirements:

Do not mold, cast, or scribe the name "City of Los Angeles" on the outside of the cabinet door as specified in LA Specification No. 54-053-08. Do not provide a Communications Terminal Panel as specified in LA Specification No. 54-053-08. Do not provide terminal block TBB on the Service Panel. Do not provide Cabinet Verification Test Program software or associated test jigs as specified in LA Specification No. 54-053-08.

Furnish unpainted, natural, aluminum cabinet shells. Ensure that all non-aluminum hardware on the cabinet is stainless steel or a Department approved non-corrosive alternate.

Ensure the lifting eyes, gasket channels, police panel, and all supports welded to the enclosure and doors are fabricated from 0.125 inch minimum thickness aluminum sheet and meet the same standards as the cabinet and doors.

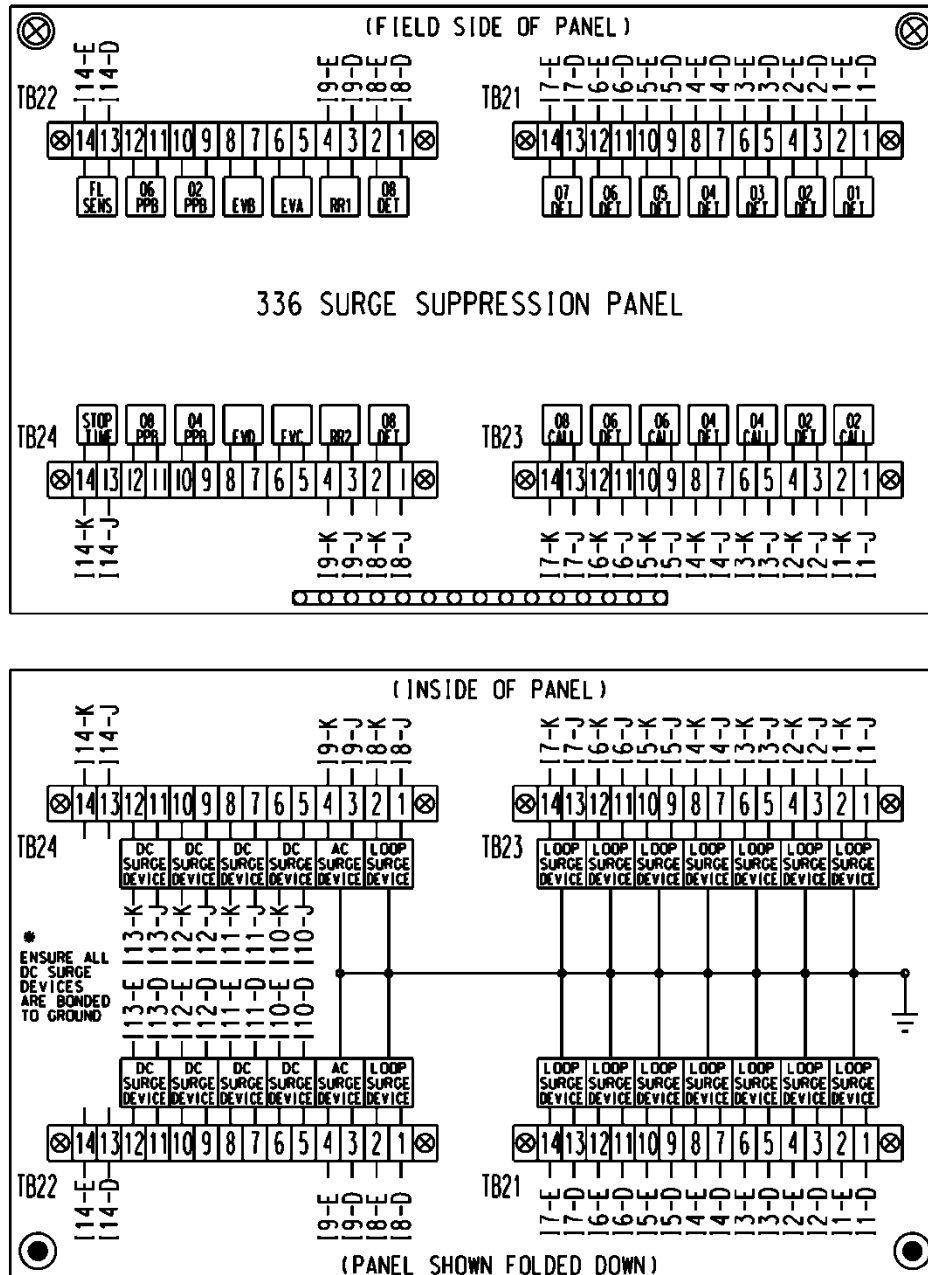
Provide front and rear doors with latching handles that allow padlocking in the closed position. Furnish 0.75 inch minimum diameter stainless steel handles with a minimum 0.5 inch shank. Place the padlocking attachment at 4.0 inches from the handle shank center to clear the lock and key. Provide an additional 4.0 inches minimum gripping length.

Provide Corbin #2 locks on the front and rear doors. Provide one (1) Corbin #2 and one (1) police master key with each cabinet. Ensure main door locks allow removal of keys in the locked position only.

Provide a surge protection panel with 16 loop surge protection devices and designed to allow sufficient free space for wire connection/disconnection and surge protection device replacement. For model 332 cabinets, provide an additional 20 loop surge protection devices. Provide an additional two AC+ interconnect surge devices to protect one slot and eight DC surge protection devices to protect four slots. Provide no protection devices on slot I14.

For pole mounted cabinets, mount surge protection devices for the AC+ interconnect inputs, inductive loop detector inputs, and low voltage DC inputs on a swing down panel assembly fabricated from sturdy aluminum. Attach the swing down panel to the bottom rear cabinet rack assembly using thumb screws. Ensure the swing down panel allows for easy removal of the input file without removing the surge protection panel assembly or its parts. Have the surge protection devices mounted horizontally on the panel and soldered to the feed through terminals of four 14 position terminal blocks with #8 screws mounted on the other side. Ensure the top row of terminals is connected to the upper slots and the bottom row of terminals is connected to the bottom slots. Provide a 15 position copper equipment ground bus attached to the field terminal side (outside) of

the swing down panel for termination of loop lead-in shield grounds. Ensure that a Number 4 AWG green wire connects the surge protection panel assembly ground bus to the main cabinet equipment ground.



devices to one side of 12 position, double row terminal blocks with #8 screws. For each surge protection panel, terminate all grounds from the surge protection devices on a copper equipment ground bus attached to the surge protection panel. Wire the terminals to the rear of a standard input file using spade lugs for input file protection.

Provide permanent labels that indicate the slot and the pins connected to each terminal that may be viewed from the rear cabinet door. Label and orient terminals so that each pair of inputs is next to each other. Indicate on the labeling the input file (I or J), the slot number (1-14) and the terminal pins of the input slots (either D & E for upper or J & K for lower).

Provide a minimum 14 x 16 inch pull out, hinged top shelf located immediately below controller mounting section of the cabinet. Ensure the shelf is designed to fully expose the table surface outside the controller at a height approximately even with the bottom of the controller. Ensure the shelf has a storage bin interior which is a minimum of 1 inch deep and approximately the same dimensions as the shelf. Provide an access to the storage area by lifting the hinged top of the shelf. Fabricate the shelf and slide from aluminum or stainless steel and ensure the assembly can support the 2070L controller plus 15 pounds of additional weight. Ensure shelf has a locking mechanism to secure it in the fully extended position and does not inhibit the removal of the 2070L controller or removal of cards inside the controller when fully extended. Provide a locking mechanism that is easily released when the shelf is to be returned to its non-use position directly under the controller.

D. Model 2018 Enhanced Conflict Monitor:

Furnish Model 2018 Enhanced Conflict Monitors that provide monitoring of 18 channels. Ensure each channel consists of a green, yellow, and red field signal input. Ensure that the conflict monitor meets or exceeds CALTRANS' Transportation Electrical Equipment Specifications dated March 12, 2009, with Erratum 1 (hereafter referred to as CALTRANS' 2009 TEES) for a model 210 monitor unit and other requirements stated in this specification.

Ensure the conflict monitor is provided with an 18 channel conflict programming card. Pin EE and Pin T of the conflict programming card shall be connected together. Pin 16 of the conflict programming card shall be floating. Ensure that the absence of the conflict programming card will cause the conflict monitor to trigger (enter into fault mode), and remain in the triggered state until the programming card is properly inserted and the conflict monitor is reset.

Provide a conflict monitor that incorporates LED indicators into the front panel to dynamically display the status of the monitor under normal conditions and to provide a comprehensive review of field inputs with monitor status under fault conditions. Ensure that the monitor indicates the channels that were active during a conflict condition and the channels that experienced a failure for all other per channel fault conditions detected. Ensure that these indications and the status of each channel are retained until the Conflict Monitor is reset. Furnish LED indicators for the following:

- AC Power (Green LED indicator)
- VDC Failed (Red LED indicator)
- WDT Error (Red LED indicator)
- Conflict (Red LED indicator)
- Red Fail (Red LED indicator)
- Dual Indication (Red LED indicator)

- Yellow/Clearance Failure (Red LED indicator)
- PCA/PC Ajar (Red LED indicator)
- Monitor Fail/Diagnostic Failure (Red LED indicator)
- 54 Channel Status Indicators (1 Red, 1 Yellow, and 1 Green LED indicator for each of the 18 channels)

Provide a switch to set the Red Fail fault timing. Ensure that when the switch is in the ON position the Red Fail fault timing value is set to 1350 +/- 150 ms (2018 mode). Ensure that when the switch is in the OFF position the Red Fail fault timing value is set to 850 +/- 150 ms (210 mode).

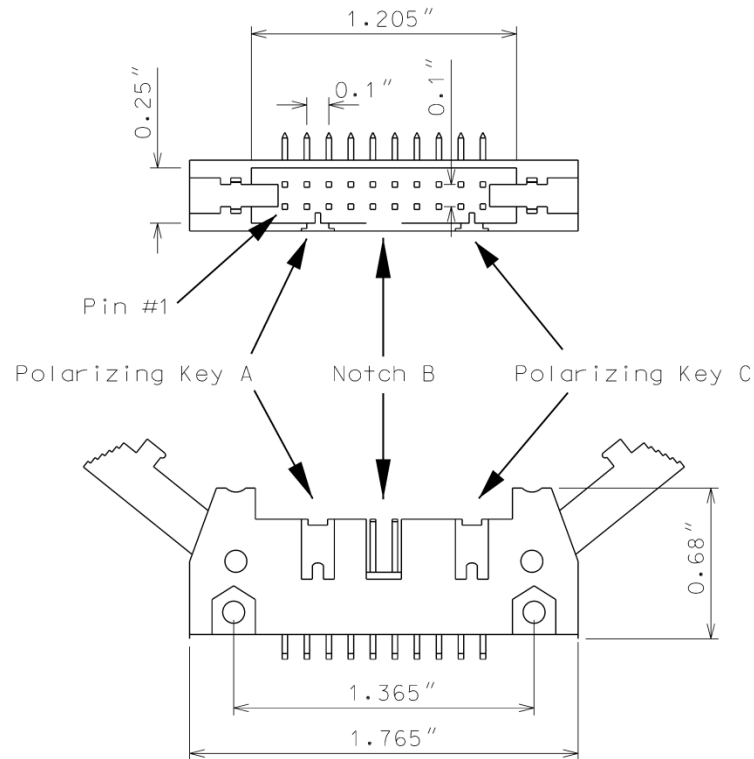
Provide a switch to set the Watchdog fault timing. Ensure that when the switch is in the ON position the Watchdog fault timing value is set to 1.0 +/- 0.1 s (2018 mode). Ensure that when the switch is in the OFF position the Watchdog fault timing value is set to 1.5 +/- 0.1 s (210 mode).

Provide a jumper or switch to set the AC line brown-out levels. Ensure that when the jumper is present or the switch is in the ON position the AC line dropout voltage threshold is 98 +/- 2 Vrms, the AC line restore voltage threshold is 103 +/- 2 Vrms, and the AC line brown-out timing value is set to 400 +/- 50ms (2018 mode). Ensure that when the jumper is not present or the switch is in the OFF position the AC line dropout voltage threshold is 92 +/- 2 Vrms, the AC line restore voltage threshold is 98 +/- 2 Vrms, and the AC line brown-out timing value is set to 80 +/- 17 ms (210 mode).

Provide a jumper or switch that will enable and disable the Watchdog Latch function. Ensure that when the jumper is not present or the switch is in the OFF position the Watchdog Latch function is disabled. In this mode of operation, a Watchdog fault will be reset following a power loss, brownout, or power interruption. Ensure that when the jumper is present or the switch is in the ON position the Watchdog Latch function is enabled. In this mode of operation, a Watchdog fault will be retained until a Reset command is issued.

Provide a jumper that will reverse the active polarity for pin #EE (output relay common). Ensure that when the jumper is not present pin #EE (output relay common) will be considered 'Active' at a voltage greater than 70 Vrms and 'Not Active' at a voltage less than 50 Vrms (Caltrans mode). Ensure that when the jumper is present pin #EE (output relay common) will be considered 'Active' at a voltage less than 50 Vrms and 'Not Active' at a voltage greater than 70 Vrms (Failsafe mode).

In addition to the connectors required by CALTRANS' 2009 TEES, provide the conflict monitor with a red interface connector mounted on the front of the monitor. Ensure the connector is a 20 pin, right angle, center polarized, male connector with latching clip locks and polarizing keys. Ensure the right angle solder tails are designed for a 0.062" thick printed circuit board. Keying of the connector shall be between pins 3 and 5, and between 17 and 19. Ensure the connector has two rows of pins with the odd numbered pins on one row and the even pins on the other row. Ensure the connector pin row spacing is 0.10" and pitch is 0.10". Ensure the mating length of the connector pins is 0.24". Ensure the pins are finished with gold plating 30μ" thick.



Ensure the red interface connector pins on the monitor have the following functions:

Pin #	Function	Pin #	Function
1	Channel 15 Red	2	Channel 16 Red
3	Channel 14 Red	4	Chassis Ground
5	Channel 13 Red	6	Special Function 2
7	Channel 12 Red	8	Special Function 1
9	Channel 10 Red	10	Channel 11 Red
11	Channel 9 Red	12	Channel 8 Red
13	Channel 7 Red	14	Channel 6 Red
15	Channel 5 Red	16	Channel 4 Red
17	Channel 3 Red	18	Channel 2 Red
19	Channel 1 Red	20	Red Enable

Ensure that removal of the P20 cable connector will cause the conflict monitor to recognize a latching fault condition and place the cabinet into flashing operation.

Provide Special Function 1 and Special Function 2 inputs to the unit which shall disable only Red Fail Monitoring when either input is sensed active. A Special Function input shall be sensed active when the input voltage exceeds 70 Vrms with a minimum duration of 550 ms. A Special Function input shall be sensed not active when the input voltage is less than 50 Vrms or the duration is less than 250 ms. A Special Function input is undefined by these specifications and may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms or the duration is between 250 ms and 550 ms.

Ensure the conflict monitor recognizes field signal inputs for each channel that meet the following requirements:

- consider a Red input greater than 70 Vrms and with a duration of at least 500 ms as an “on” condition;
- consider a Red input less than 50 Vrms or with a duration of less than 200 ms as an “off” condition (no valid signal);
- consider a Red input between 50 Vrms and 70 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications;
- consider a Green or Yellow input greater than 25 Vrms and with a duration of at least 500 ms as an “on” condition;
- consider a Green or Yellow input less than 15 Vrms or with a duration of less than 200 ms as an “off” condition; and
- consider a Green or Yellow input between 15 Vrms and 25 Vrms or with a duration between 200 ms and 500 ms to be undefined by these specifications.

Provide a conflict monitor that recognizes the faults specified by CALTRANS’ 2009 TEES and the following additional faults. Ensure the conflict monitor will trigger upon detection of a fault and will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input for the following failures:

1. **Red Monitoring or Absence of Any Indication (Red Failure):** A condition in which no “on” voltage signal is detected on any of the green, yellow, or red inputs to a given monitor channel. If a signal is not detected on at least one input (R, Y, or G) of a conflict monitor channel for a period greater than 1000 ms when used with a 170 controller and 1500 ms when used with a 2070 controller, ensure monitor will trigger and put the intersection into flash. If the absence of any indication condition lasts less than 700 ms when used with a 170 controller and 1200 ms when used with a 2070 controller, ensure conflict monitor will not trigger. Red fail monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. Have red monitoring occur when all of the following input conditions are in effect:
 - a) Red Enable input to monitor is active (Red Enable voltages are “on” at greater than 70 Vrms, off at less than 50 Vrms, undefined between 50 and 70 Vrms), and
 - b) Neither Special Function 1 nor Special Function 2 inputs are active.

- c) Pin #EE (output relay common) is not active
2. **Short/Missing Yellow Indication Fault (Clearance Error):** Yellow indication following a green is missing or shorter than 2.7 seconds (with ± 0.1 -second accuracy). If a channel fails to detect an “on” signal at the Yellow input for a minimum of 2.7 seconds (± 0.1 second) following the detection of an “on” signal at a Green input for that channel, ensure that the monitor triggers and generates a clearance/short yellow error fault indication. Short/missing yellow (clearance) monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. This fault shall not occur when the channel is programmed for Yellow Inhibit, when the Red Enable signal is inactive or pin #EE (output relay common) is active.
 3. **Dual Indications on the Same Channel:** In this condition, more than one indication (R,Y,G) is detected as “on” at the same time on the same channel. If dual indications are detected for a period greater than 500 ms, ensure that the conflict monitor triggers and displays the proper failure indication (Dual Ind fault). If this condition is detected for less than 200 ms, ensure that the monitor does not trigger. G-Y-R dual indication monitoring shall be enabled on a per channel basis by the use of switches located on the conflict monitor. G-Y dual indication monitoring shall be enabled for all channels by use of a switch located on the conflict monitor. This fault shall not occur when the Red Enable signal is inactive or pin #EE (output relay common) is active.
 4. **Configuration Settings Change:** The configuration settings are comprised of (as a minimum) the permissive diode matrix, dual indication switches, yellow disable jumpers, any option switches, any option jumpers, and the Watchdog Enable switch. Ensure the conflict monitor compares the current configuration settings with the previous stored configuration settings on power-up, on reset, and periodically during operation. If any of the configuration settings are changed, ensure that the conflict monitor triggers and causes the program card indicator to flash. Ensure that configuration change faults are only reset by depressing and holding the front panel reset button for a minimum of three seconds. Ensure the external remote reset input does not reset configuration change faults.

Ensure the conflict monitor will trigger and the AC Power indicator will flash at a rate of 2 Hz \pm 20% with a 50% duty cycle when the AC Line voltage falls below the “drop-out” level. Ensure the conflict monitor will resume normal operation when the AC Line voltage returns above the “restore” level. Ensure the AC Power indicator will remain illuminated when the AC voltage returns above the “restore” level. Should an AC Line power interruption occur while the monitor is in the fault mode, then upon restoration of AC Line power, the monitor will remain in the fault mode and the correct fault and channel indicators will be displayed.

Provide a flash interval of at least 6 seconds and at most 10 seconds in duration following a power-up, an AC Line interruption, or a brownout restore. Ensure the conflict monitor will suspend all fault monitoring functions, close the Output relay contacts, and flash the AC indicator at a rate of 4 Hz \pm 20% with a 50% duty cycle during this interval. Ensure the termination of the flash interval after at least 6 seconds if the Watchdog input has made 5 transitions between the True and False state and the AC Line voltage is greater than the “restore” level. If the watchdog input has not made

5 transitions between the True and False state within 10 ± 0.5 seconds, the monitor shall enter a WDT error fault condition.

Ensure the conflict monitor will monitor an intersection with a minimum of four approaches using the four-section Flashing Yellow Arrow (FYA) vehicle traffic signal as outlined by the NCHRP 3-54 research project for protected-permissive left turn signal displays. Ensure the conflict monitor will operate in the FYA mode and FYAc (Compact) mode as specified below to monitor each channel pair for the following fault conditions: Conflict, Flash Rate Detection, Red Fail, Dual Indication, and Clearance. Provide a switch to select between the FYA mode and FYAc mode. Provide a switch to select each FYA phase movement for monitoring.

FYA mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 9 Red	Channel 10 Red	Channel 11 Red	Channel 12 Red
Yellow Arrow	Channel 9 Yellow	Channel 10 Yellow	Channel 11 Yellow	Channel 12 Yellow
Flashing Yellow Arrow	Channel 9 Green	Channel 10 Green	Channel 11 Green	Channel 12 Green
Green Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green

FYAc mode

FYA Signal Head	Phase 1	Phase 3	Phase 5	Phase 7
Red Arrow	Channel 1 Red	Channel 3 Red	Channel 5 Red	Channel 7 Red
Yellow Arrow	Channel 1 Yellow	Channel 3 Yellow	Channel 5 Yellow	Channel 7 Yellow
Flashing Yellow Arrow	Channel 1 Green	Channel 3 Green	Channel 5 Green	Channel 7 Green
Green Arrow	Channel 9 Green	Channel 9 Yellow	Channel 10 Green	Channel 10 Yellow

If a FYA channel pair is enabled for FYA operation, the conflict monitor will monitor the FYA logical channel pair for the additional following conditions:

1. **Conflict:** Channel conflicts are detected based on the permissive programming jumpers on the program card. This operation remains unchanged from normal operation except for the solid Yellow arrow (FYA clearance) signal.
2. **Yellow Change Interval Conflict:** During the Yellow change interval of the Permissive Turn channel (flashing Yellow arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active. These conflicting channels shall be determined by the program card compatibility programming of the Permissive Turn channel (flashing Yellow arrow). During the Yellow change interval of the Protected Turn channel (solid Green arrow) the conflict monitor shall verify that no conflicting channels to the solid Yellow arrow channel (clearance) are active as determined by the program card compatibility programming of the Protected Turn channel (solid Green arrow).
3. **Flash Rate Detection:** The conflict monitor unit shall monitor for the absence of a valid flash rate for the Permissive turn channel (flashing Yellow arrow). If the Permissive turn channel (flashing Yellow arrow) is active for a period greater than 1600 milliseconds, ensure the conflict monitor triggers and puts the intersection into flash. If the Permissive turn channel (flashing Yellow arrow) is active for a period less than 1400 milliseconds, ensure the conflict monitor does not trigger. Ensure the conflict monitor will remain in the triggered (in fault mode) state until the unit is reset at the front panel or through the external remote reset input. Provide a jumper or switch that will enable and disable the Flash Rate Detection function. Ensure that when the jumper is not present or the switch is in the OFF position the Flash Rate Detection function is enabled. Ensure that when the jumper is present or the switch is in the ON position the Flash Rate Detection function is disabled.
4. **Red Monitoring or Absence of Any Indication (Red Failure):** The conflict monitor unit shall detect a red failure if there is an absence of voltage on all four of the inputs of a FYA channel pair (RA, YA, FYA, GA).
5. **Dual Indications on the Same Channel:** The conflict monitor unit shall detect a dual indication if two or more inputs of a FYA channel pair (RA, YA, FYA, GA) are “on” at the same time.
6. **Short/Missing Yellow Indication Fault (Clearance Error):** The conflict monitor unit shall monitor the solid Yellow arrow for a clearance fault when terminating both the Protected Turn channel (solid Green arrow) interval and the Permissive Turn channel (flashing Yellow arrow) interval.

Ensure that the conflict monitor will log at least nine of the most recent events detected by the monitor in non-volatile EEPROM memory (or equivalent). For each event, record at a minimum the time, date, type of event, status of each field signal indication with RMS voltage, and specific channels involved with the event. Ensure the conflict monitor will log the following events: monitor reset, configuration, previous fault, and AC line. Furnish the signal sequence log that shows all channel states (Greens, Yellows, and Reds) and the Red Enable State for a minimum of 2 seconds prior to the current fault trigger point. Ensure the display resolution of the inputs for the signal sequence log is not greater than 50 ms.

For conflict monitors used within an Ethernet communications system, provide a conflict monitor with an Ethernet 10/100 Mbps, RJ-45 port for data communication access to the monitor by a local notebook computer and remotely via a workstation or notebook computer device connected to the signal system local area network. The Ethernet port shall be electrically isolated from the conflict monitor's electronics and shall provide a minimum of 1500 Vrms isolation. Integrate monitor with Ethernet network in cabinet. Provide software to retrieve the time and date from a network server in order to synchronize the on-board times between the conflict monitor and the controller. Furnish and install the following Windows based, graphic user interface software on workstations and notebook computers where the signal system client software is installed: 1) software to view and retrieve all event log information, 2) software that will search and display a list of conflict monitor IP addresses and IDs on the network, and 3) software to change the conflict monitor's network parameters such as IP address and subnet mask.

For non-Ethernet connected monitors, provide a RS-232C/D compliant port (DB-9 female connector) on the front panel of the conflict monitor in order to provide communications from the conflict monitor to the 170/2070 controller or to a Department-furnished laptop computer. Electrically isolate the port interface electronics from all monitor electronics, excluding Chassis Ground. Ensure that the controller can receive all event log information through a controller Asynchronous Communications Interface Adapter (Type 170E) or Async Serial Comm Module (2070). Furnish and connect a serial cable from the conflict monitor's DB-9 connector to Comm Port 1 of the 2070 controller. Ensure conflict monitor communicates with the controller. Provide a Windows based graphic user interface software to communicate directly through the same monitor RS-232C/D compliant port to retrieve and view all event log information to a Department-furnished laptop computer. The RS-232C/D compliant port on the monitor shall allow the monitor to function as a DCE device with pin connections as follows:

Conflict Monitor RS-232C/D (DB-9 Female) Pinout		
Pin Number	Function	I/O
1	DCD	O
2	TX Data	O
3	RX Data	I
4	DTR	I
5	Ground	-
6	DSR	O
7	CTS	I
8	RTS	O
9	NC	-

MONITOR BOARD EDGE CONNECTOR

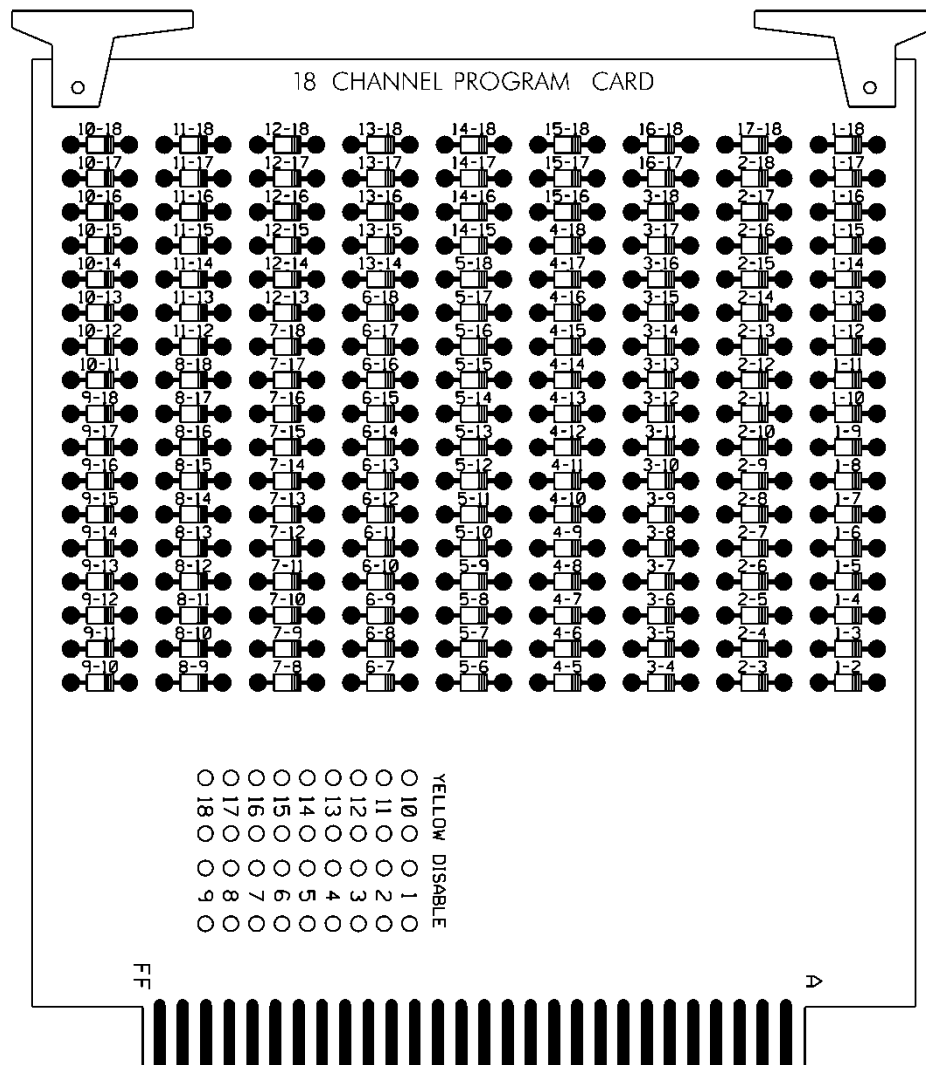
Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 2 Yellow
2	Channel 13 Green	B	Channel 6 Green
3	Channel 6 Yellow	C	Channel 15 Green
4	Channel 4 Green	D	Channel 4 Yellow
5	Channel 14 Green	E	Channel 8 Green
6	Channel 8 Yellow	F	Channel 16 Green
7	Channel 5 Green	H	Channel 5 Yellow
8	Channel 13 Yellow	J	Channel 1 Green
9	Channel 1 Yellow	K	Channel 15 Yellow
10	Channel 7 Green	L	Channel 7 Yellow
11	Channel 14 Yellow	M	Channel 3 Green
12	Channel 3 Yellow	N	Channel 16 Yellow
13	Channel 9 Green	P	Channel 17 Yellow
14	Channel 17 Green	R	Channel 10 Green
15	Channel 11 Yellow	S	Channel 11 Green
16	Channel 9 Yellow	T	Channel 18 Yellow
17	Channel 18 Green	U	Channel 10 Yellow
--		--	
18	Channel 12 Yellow	V	Channel 12 Green
19	Channel 17 Red	W	Channel 18 Red
20	Chassis Ground	X	Not Assigned
21	AC-	Y	DC Common
22	Watchdog Timer	Z	External Test Reset
23	+24VDC	AA	+24VDC
24	Tied to Pin 25	BB	Stop Time (Output)
25	Tied to Pin 24	CC	Not Assigned
26	Not Assigned	DD	Not Assigned
27	Relay Output, Side #3, N.O.	EE	Relay Output, Side #2, Common
28	Relay Output, Side #1, N.C.	FF	AC+

-- Slotted for keying between Pins 17/U and 18/V

CONFLICT PROGRAM CARD PIN ASSIGNMENTS

Pin #	Function (Back Side)	Pin #	Function (Component Side)
1	Channel 2 Green	A	Channel 1 Green
2	Channel 3 Green	B	Channel 2 Green
3	Channel 4 Green	C	Channel 3 Green
4	Channel 5 Green	D	Channel 4 Green
5	Channel 6 Green	E	Channel 5 Green
6	Channel 7 Green	F	Channel 6 Green
7	Channel 8 Green	H	Channel 7 Green
8	Channel 9 Green	J	Channel 8 Green
9	Channel 10 Green	K	Channel 9 Green
10	Channel 11 Green	L	Channel 10 Green
11	Channel 12 Green	M	Channel 11 Green
12	Channel 13 Green	N	Channel 12 Green
13	Channel 14 Green	P	Channel 13 Green
14	Channel 15 Green	R	Channel 14 Green
15	Channel 16 Green	S	Channel 15 Green
16	N/C	T	PC AJAR
17	Channel 1 Yellow	U	Channel 9 Yellow
18	Channel 2 Yellow	V	Channel 10 Yellow
19	Channel 3 Yellow	W	Channel 11 Yellow
20	Channel 4 Yellow	X	Channel 12 Yellow
21	Channel 5 Yellow	Y	Channel 13 Yellow
22	Channel 6 Yellow	Z	Channel 14 Yellow
23	Channel 7 Yellow	AA	Channel 15 Yellow
24	Channel 8 Yellow	BB	Channel 16 Yellow
--		--	
25	Channel 17 Green	CC	Channel 17 Yellow
26	Channel 18 Green	DD	Channel 18 Yellow
27	Channel 16 Green	EE	PC AJAR (Program Card)
28	Yellow Inhibit Common	FF	Channel 17 Green

-- Slotted for keying between Pins 24/BB and 25/CC



E. Preemption and Sign Control Box

Provide preemption and sign control box to operate in a Model 332 and Model 336S cabinet. Provide hardware to mount the box to the cage of the cabinet to ensure the front side is facing the opposite side of the cabinet. Furnish the material of the box from a durable finished metallic or thermoplastic case. Ensure the size of the box is not greater than 7(l) x 5(w) x 5(d) inches. Ensure that no modification is necessary to mount the box on the cabinet cage.

Provide the following components in the preemption and sign control box: relays, fuses, terminal blocks, MOVs, resistor, RC network, lamp, and push button switch.

Provide UL Listed or Recognized relay K1 as a DPDT enclosed relay (120 VAC, 60 Hz coil) with an 8-pin octal-style plug and associated octal base. Provide contact material made of AgCdO with a 10 amp, 240 VAC rating. Ensure the relay has a specified pickup voltage of 102 VAC.

Provide relay SSR1 as a Triac SPST normally open solid state relay that is rated for 120 VAC input and zero-crossing (resistive load) 25 amp @ 120 VAC output. Ensure the relay turns on at 90 Vrms within 10 ms and turns off at 10 Vrms within 40 ms. Ensure the relay has physical

characteristics as shown in the wiring detail in Figure 1. Provide 4 terminal screws with saddle clamps.

Provide fuses F1 and F2 as a UL Listed ¼" x 1-1/4" glass tube rated at 250 volts with a 10kA interrupting rating. Ensure F1 non-delay (fast-acting) and F2 slow-blow (time-delay) fuses have a maximum opening times of 60 minutes and 120 seconds for currents of 135 and 200 percent of the ampere rating, respectively. Ensure F2 slow-blow (time-delay) fuses have a minimum opening times of 12 seconds at 200 percent of the ampere rating. Provide fuse holders that are UL Recognized panel-mounted holders rated 250V, 15 ampere minimum with bayonet-type knobs which accept ¼" x 1-1/4" glass tube fuses.

Provide terminal blocks that are rated for 300V and are made of electrical grade thermoplastic or thermosetting plastic. Ensure each terminal block is of closed back design and has recessed-screw terminals with molded barriers between terminals. Ensure each terminal block is labeled with a block designation. Ensure each terminal is labeled with the function and a number.

Provide 3/4-inch diameter radial lead UL-recognized metal oxide varistors (MOVs) that have electrical performance as outlined below.

PROPERTIES OF MOV SURGE PROTECTOR	
Maximum Continuous Applied Voltage at 185° F	150 VAC (RMS) 200 VDC
Maximum Peak 8x20µs Current at 185° F	6500 A
Maximum Energy Rating at 185° F	80 J
Voltage Range 1 mA DC Test at 77° F	212-268 V
Max. Clamping Voltage 8x20µs, 100A at 77° F	395 V
Typical Capacitance (1 MHz) at 77° F	1600 pF

Provide resistor R1 as a 2K ohm, 12 watt, wirewound resistor with tinned terminals and attaching leads. Ensure the resistor is spaced apart from surrounding wires.

Provide a LED or incandescent lamp that has a voltage rating of 120 VAC with a minimum life rating at 50,000 hours.

Wire the preemption and sign control box as shown in Figure 1.

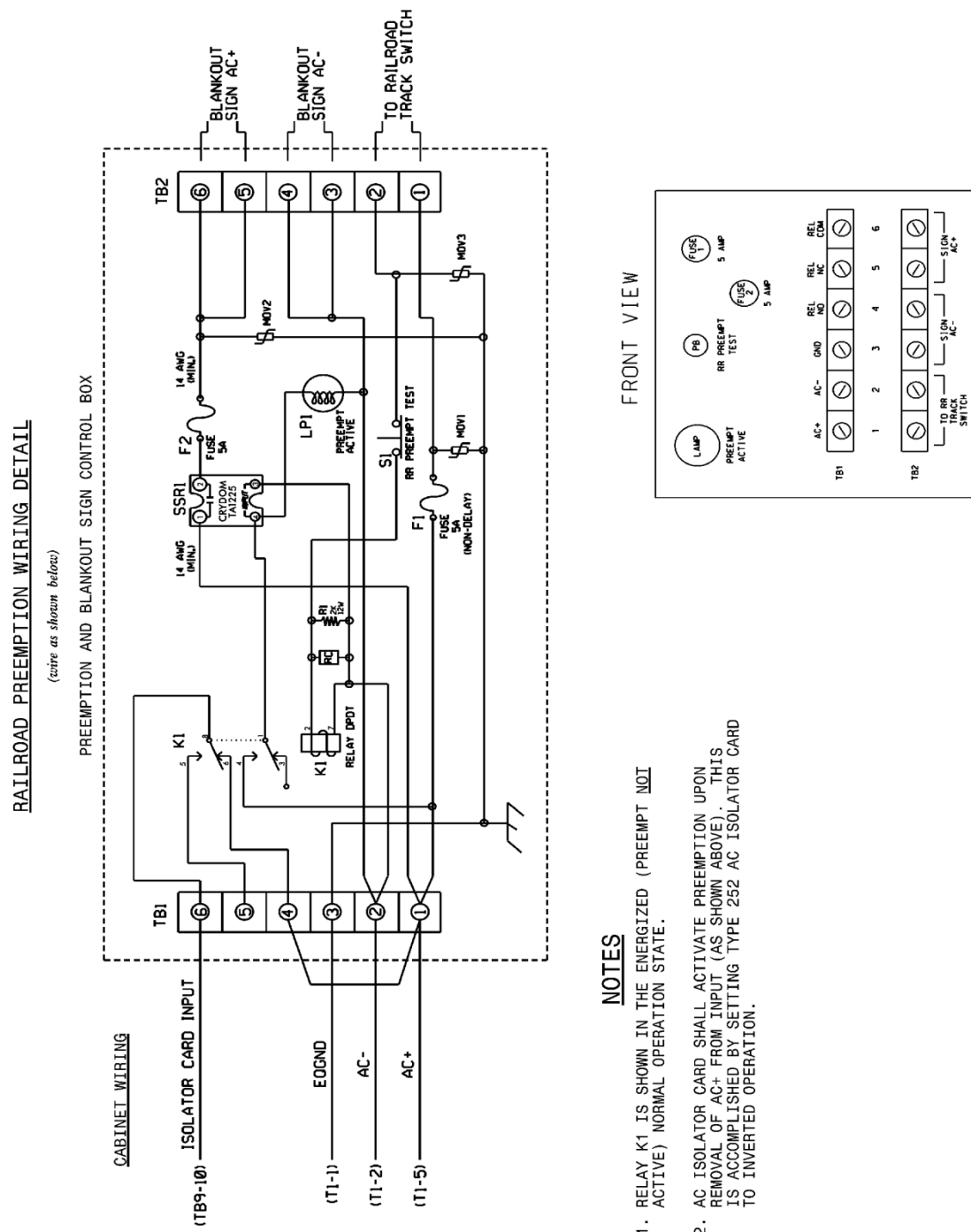


Figure 1

3.3. MATERIALS – TYPE 170 DETECTOR SENSOR UNITS

Furnish detector sensor units that comply with Chapter 5 Section 1, “General Requirements,” and Chapter 5 Section 2, “Model 222 & 224 Loop Detector Sensor Unit Requirements,” of the CALTRANS “Transportation Electrical Equipment Specifications” dated March 12, 2009 with Erratum 1.

3.4. MATERIALS – TYPE 2070E CONTROLLERS

Furnish model 2070E controller units that conform to CALTRANS *Transportation Electrical Equipment Specifications* (TEES) (dated March 12, 2009, plus Errata 1 dated January 21, 2010 and Errata 2 dated December 5, 2014) except as required herein.

The Department will provide software at the beginning of the burning-in period. Contractor shall give 5 working days notice before needing software. Program software provided by the Department.

Provide model 2070E controllers with OS-9 release 1.3.1 or later with kernel edition #380 or later operating software and device drivers, composed of the unit chassis and at a minimum the following modules and assemblies:

- MODEL 2070-1E, CPU Module, Single Board, with 8Mb Datakey (blue in color)
- MODEL 2070-2E+, Field I/O Module (FI/O)
 - Note: Configure the Field I/O Module to disable both the External WDT Shunt/Toggle Switch and SP3 (SP3 active indicator is “off”)
- MODEL 2070-3B, Front Panel Module (FP), Display B (8x40)
- MODEL 2070-4A, Power Supply Module, 10 AMP
- MODEL 2070-7A, Async Serial Com Module (9-pin RS-232)

4. VIDEO IMAGING LOOP EMULATOR DETECTOR SYSTEMS

4.1. DESCRIPTION

Design, furnish, provide training, and install video imaging loop emulator detection systems with all necessary hardware in accordance with the plans and specifications.

Unless otherwise specified in the contract, all loop emulator detection equipment will remain the property of the contractor.

4.2. MATERIALS

A. General:

Material and equipment furnished under this section must be pre-approved on the Department’s QPL by the date of installation except miscellaneous hardware such as cables and mounting hardware do not need to be pre-approved.

Used equipment will be acceptable provided the following conditions have been met:

- Equipment is listed on the current QPL.
- Equipment is in good working condition.
- Equipment is to remain the property of the contractor.

Ensure that software is licensed for use by the Department and by any other agency responsible for maintaining or operating the loop emulation system. Provide the Department with a license to duplicate and distribute the software as necessary for design and maintenance support.

Design and furnish video imaging loop emulator detection systems that detect vehicles at signalized intersections by processing video images and providing detection outputs to the signal controller in real time (within 112 milliseconds of vehicle arrival).

Furnish all required camera sensor units, loop emulator processor units, hardware and software packages, cabling, poles, mast arms, harnesses, camera mounting assemblies, surge protection panels, grounding systems, messenger cable and all necessary hardware. Furnish systems that allow the display of detection zones superimposed on an image of the roadway on a Department-furnished monitor or laptop computer screen. Ensure detection zones can be defined and data entered using a simple keyboard or mouse and monitor, or using a laptop PC with software.

Provide design drawings showing design details and camera sensor unit locations for review and acceptance before installation. Provide mounting height and location requirements for camera sensor units on the design based on site survey. Design video imaging loop emulator detection systems with all necessary hardware. Indicate all necessary poles, spans, mast arms, luminaire arms, cables, camera mounting assemblies and hardware to achieve the required detection zones where Department owned poles are not adequate to locate the camera sensor units. Do not design for the installation of poles in medians.

Obtain the Engineer's approval before furnishing video imaging loop emulator detection systems. The contractor is responsible for the final design of video imaging loop emulator detection systems. Review and acceptance of the designs by the Department does not relieve the contractor from the responsibility to provide fully functional systems and to ensure that the required detection zones can be provided.

Provide the ability to program each detection call (input to the controller) with the following functions:

- Full Time Delay – Delay timer is active continuously,
- Normal Delay – Delay timer is inhibited when assigned phase is green (except when used with TS 2 and 170/2070L controllers),
- Extend – Call is extended for this amount of time after vehicle leaves detection area,
- Delay Call/Extend Call – This feature uses a combination of full time delay and extend time on the same detection call. Ensure operation is as follows: Vehicle calls are received after the delay timer times out. When a call is detected, it is held until the detection area is empty and the programmed extend time expires. If another vehicle enters the detection area before the extend timer times out, the call is held and the extend time is reset. When the extend timer times out, the delay timer has to expire before another vehicle call can be received.

Provide the ability to program each detection zone as one of the following functions:

- Presence detector,
- Directional presence detector,
- Pulse detector,

- Directional pulse detector.

Ensure previously defined detector zones and configurations can be edited.

Provide each individual system with all the necessary equipment to focus and zoom the camera lenses without the need to enter the camera enclosure.

Provide systems that allow for the placement of at least 8 detection zones within the combined field of view of a single camera sensor unit. Provide a minimum of 8 detection outputs per camera.

Provide detection zones that can be overlapped. Ensure systems reliably detect vehicles when the horizontal distance from the camera sensor unit to the detection zone area is less than ten times the mounting height of the sensor. Ensure systems detect vehicles in multiple travel lanes.

Ensure systems can detect vehicle presence within a 98 to 102 percent accuracy (up to 2 percent of the vehicles missed and up to 2 percent of false detection) for clear, dry, daylight conditions, a 96 to 105 percent accuracy (up to 4 percent of the vehicles missed and up to 5 percent false detection) for dawn and dusk conditions, and a 96 percent accuracy (up to 4 percent of the vehicles missed) for night and adverse conditions (fog, snow, rain, etc.) using standard sensor optics and in the absence of occlusion.

Repair and replace all failed components within 72 hours.

The Department may conduct field-testing to ensure the accuracy of completed video imaging loop emulator detection systems.

B. Loop Emulator System:

Furnish loop emulator systems that receive and simultaneously process information from camera sensor units, and provides detector outputs to signal controllers.

Ensure systems provide the following:

- Operate in a typical roadside environment and meet the environmental specifications and are fully compatible with NEMA TS 1, NEMA TS 2, or Type 170/2070L controllers and cabinets,
- provide a “fail-safe” mode whereby failure of one or more of the camera sensor units or power failure of the loop emulator system will cause constant calls to be placed on the affected vehicle detection outputs to the signal controller,
- provide compensation for minor camera movement of up to 2 percent of the field of view at 400 feet without falsely detecting vehicles,
- process the video at a minimum rate of 30 times per second,
- provide separate wired connectors inside the controller cabinet for video recording each camera,
- provide remote video monitoring with a minimum refresh rate at 1 frame per second over a standard dial-up telephone line,
- provide remote video detection monitoring.

Furnish camera sensor units that comply with the following:

- have an output signal conforming to EIA RS-170 standard,

- have a nominal output impedance of 75 ohms,
- be immune to bright light sources, or have built in circuitry or protective devices to prevent damage to the sensor when pointed directly at strong light sources,
- be housed in a light colored environmental enclosure that is water proof and dust tight, and that conforms to NEMA-4 specifications or better,
- simultaneously monitor at least five travel lanes when placed at the proper mounting location with a zoom lens,
- have a sunshield attached to the environmental enclosure to minimize solar heating,
- meet FCC class B requirements for electromagnetic interference emissions,
- have a heater attached to the viewing window of the environmental enclosure to prevent ice and condensation in cold weather.

Where coaxial video cables and other cables are required between the camera sensor and other components located in the controller cabinet, furnish surge protection in the controller cabinet.

If furnishing coaxial communications cable comply with the following, as recommended by the approved loop emulator manufacturer:

- Number 20 AWG, solid bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor to the signal controller cabinet.
- Number 22 AWG, stranded bare copper conductor terminated with crimped-on BNC connectors (do not use BNC adapters) from the camera sensor unit to the junction box, and within the signal controller cabinet.

Furnish power cable appropriately sized to meet the power requirements of the sensors. At a minimum, provide three conductor 120 VAC field power cable.

As determined during the site survey, furnish sensor junction boxes with nominal 6 x 10 x 6 inches dimensions at each sensor location. Provide terminal blocks and tie points for coaxial cable.

C. Video Imaging Loop Emulator System Support:

Furnish video imaging loop emulator systems with either a simple keyboard or a mouse with monitor and appropriate software, or with system software for use on department-owned laptop PCs. Ensure the system is Windows 2000 and Windows XP compatible.

Provide Windows 2000 and Windows XP compatible personal computer software, if needed, to provide remote video and video detection monitoring.

Ensure systems allow the user to edit previously defined detector configurations. When a vehicle is within a detection zone, provide for a change in color or intensity of the detection zone perimeter or other appropriate display changes on the Department-furnished monitor or laptop computer screen.

Provide cabling and interconnection hardware with 6-foot minimum length interconnection cable to interface with the system.

Provide all associated equipment manuals and documentation.

4.3. CONSTRUCTION METHODS

Arrange and conduct site surveys with the system manufacturer's representative and Department personnel to determine proper camera sensor unit selection and placement. Provide the Department at least 3 working days notice before conducting site surveys. Upon completion of the site surveys the Department will provide revised plans reflecting the findings of the site survey.

Before beginning work at locations requiring video imaging loop emulator detection systems, furnish system software. Upon activation of detection zones, provide detector configuration files. Ensure that up-to-date detection configuration files are furnished for various detection zone configurations that may be required for construction phasing.

Place into operation loop emulator detection systems. Configure loop emulator detection systems to achieve required detection in designated zones. Have a certified manufacturer's representative on site to supervise and assist with installation, set up, and testing of the system.

Install the necessary processing and communications equipment in the signal controller cabinet. Make all necessary modifications to install equipment, cabling harnesses, and camera sensor interface panels with surge suppression.

Perform modifications to camera sensor unit gain, sensitivity, and iris limits necessary to complete the installation.

Do not install camera sensor units on signal poles unless approved by the Engineer.

Install the necessary cables from each sensor to the signal controller cabinet along signal cabling routes. Install surge protection and terminate all cable conductors.

Relocate camera sensor units and reconfigure detection zones as necessary according to the plans for construction phases.

Provide at least 8 hours of training on the set up, operation, troubleshooting, and maintenance of the loop emulator detection system to a maximum of ten Department personnel. Arrange for training to be conducted by the manufacturer's representative at an approved site within the Division responsible for administration of the project. Thirty days before conducting training submit a detailed course curriculum, draft manuals and materials, and resumes. Obtain approval of the submittal before conducting the training. At least one week before beginning training, provide three sets of complete documentation necessary to maintain and operate the system. Do not perform training until installation of loop emulator detection systems is complete.

4.4. MEASUREMENT AND PAYMENT

Actual number of site surveys, arranged, conducted, and accepted.

Actual number of luminaire arms for video systems furnished, installed, and accepted.

Actual number of cameras without internal loop emulator processing units furnished, installed, and accepted.

Actual number of external loop emulator processing units furnished, installed, and accepted.

Actual number of camera sensor units relocated with detection zones reconfigured installed, and accepted.

No measurement will be made of video imaging loop emulator system support or training, power and video cables, and trenching as these items will be considered incidental to furnishing and installing video imaging loop emulator detection systems.

Payment will be made under:

Site Survey	Each
Luminaire Arm for Video System	Each
Camera without Internal Loop Emulator Processing Unit.....	Each
External Loop Emulator Processing Unit	Each
Relocate Camera Sensor Unit	Each

5. TRAFFIC SIGNAL SUPPORTS

5.1. METAL TRAFFIC SIGNAL SUPPORTS – ALL POLES

A. General:

Furnish and install metal strain poles, grounding systems, and all necessary hardware. The work covered by this special provision includes requirements for the design, fabrication, and installation of both standard and custom/site specifically designed metal traffic signal supports and associated foundations.

Provide metal traffic signal support systems that contain no guy assemblies, struts, or stay braces. Provide designs of completed assemblies with hardware that equals or exceeds AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* 6th Edition, 2013 (hereafter called 6th Edition AASHTO), including the latest interim specifications. Provide assemblies with a round or near-round (18 sides or more) cross-section, or a multi sided cross section with no less than six sides. The sides may be straight, convex, or concave.

Pole heights shown on signal plans are estimated from available data for bid purposes. Prior to furnishing metal signal poles, use field measurements and adjusted cross-sections to determine whether pole heights are sufficient to obtain required clearances. If pole heights are not sufficient, the Contractor should immediately notify the Engineer of the required revised pole heights.

Ensure that metal signal poles permit cables to be installed inside poles and any required mast arms. For holes in the poles and arms used to accommodate cables, provide full-circumference grommets. Arm flange plate wire access holes should be deburred, non grommited, and oversized to fit around the 2" diameter grommited shaft flange plate wire access hole.

After fabrication, have steel poles, required mast arms, and all parts used in the assembly hot-dip galvanized per section 1076. Design structural assemblies with weep holes large enough and properly located to drain molten zinc during the galvanization process. Provide hot-dip galvanizing on structures that meets or exceeds ASTM Standard A-123. Provide galvanizing on hardware that meets or exceeds ASTM Standard A-153. Ensure that threaded material is brushed and retapped as necessary after galvanizing. Perform repair of damaged galvanizing that complies with the following:

Repair of GalvanizingArticle 1076-7

Standard Drawings for Metal Poles are available that supplement these project special provisions. These drawings are located on the Department's website:

<https://connect.ncdot.gov/resources/safety/pages/ITS-Design-Resources.aspx>

Comply with article 1098-1B of the *2018 STANDARD SPECIFICATIONS FOR ROADS & STRUCTURES*, hereinafter referred to as the *Standard Specifications* for submittal requirements. Furnish shop drawings for approval. Provide the copies of detailed shop drawings for each type of structure as summarized below. Ensure that shop drawings include material specifications for each component and identify welds by type and size on the detail drawing only, not in table format. **Do not release structures for fabrication until shop drawings have been approved by NCDOT.** Provide an itemized bill of materials for all structural components and associated connecting hardware on the drawings.

Comply with article 1098-1A of the *Standard Specifications* for Qualified Products List (QPL) submittals. All shop drawings must include project location description, signal inventory number(s) and a project number or work order number on the drawings.

Summary of information required for metal pole review submittal:

Item	Hardcopy Submittal	Electronic Submittal	Comments / Special Instructions
Sealed, Approved Signal Plan/Loading Diagram	1	1	All structure design information needs to reflect the latest approved signal plans
Custom Pole Shop Drawings	4 sets	1 set	Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages.
Standard Pole Shop Drawings (from the QPL)	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages.
Structure Calculations	1 set	1 set	Not required for Standard QPL Poles
Standard Pole Foundation Drawings	1 set	1 set	Submit drawings on 11" x 17" format media. Submit a completed Standard Foundation Selection form for each pole using foundation table on Metal Pole Drawing M-8.
Custom Foundation Drawings	4 sets	1 set	Submit drawings on 11" x 17" format media. Show NCDOT inventory number(s), contractor's name and relevant revision number in the title block. All drawings must have a <u>unique drawing</u> number for each project and identified for multiple pages. If QPL Poles are used, include the corresponding QPL pole shop drawings with this submittal.

Foundation Calculations	1	1	Submit copies of LPILE input, output and pile tip deflection graph per Section 11.4 of this specification for each foundation. Not required for Standard QPL Poles
Soil Boring Logs and Report	1	1	Report should include a location plan and a soil classification report including soil capacity, water level, hammer efficiency, soil bearing pressure, soil density, etc. for each pole.

NOTE – All shop drawings and custom foundation design drawings must be sealed by a Professional Engineer licensed in the state of North Carolina. All geotechnical information must be sealed by either a Professional Engineer or geologist licensed in the state of North Carolina. Include a title block and revision block on the shop drawings and foundation drawings showing the NCDOT inventory number.

Shop drawings and foundation drawings may be submitted together or separately for approval. However, shop drawings must be approved before foundations can be reviewed. Foundation designs will be returned without review if the associated shop drawing has not been approved. Boring reports should include the following: Engineer's summary, boring location maps, soil classification per AASHTO Classification System, hammer efficiency, and Metal Pole Standard Foundation Selection Form. Incomplete submittals will be returned without review. The Reviewer has the right to request additional analysis and copies of the calculations to expedite the approval process.

B. Materials:

Fabricate metal pole and arm shaft from coil or plate steel to meet the requirements of ASTM A 595 Grade A tubes. For structural steel shapes, plates and bars use A572 Gr 50 min or ASTM A709 Gr 50 min. Provide pole and arm shafts that are round in cross section or multisided tubular shapes and have a uniform linear taper of 0.14 in/ft. Construct shafts from one piece of single ply plate or coil so there are no circumferential weld splices. Galvanize in accordance with AASHTO M 111 or an approved equivalent.

Use the submerged arc process or other NCDOT previously approved process suitable for pole shaft and arms to continuously weld pole shafts and arm shafts along their entire length. The longitudinal seam weld will be finished flush to the outside contour of the base metal. Ensure shafts have no circumferential welds except at the lower end joining the shaft to the pole base and arm base. Use full penetration groove welds with backing ring for all tube-to-transverse-plate connections in accordance with 6th Edition AASHTO. Provide welding that conforms to Article 1072-18 of the *Standard Specifications*, except that no field welding on any part of the pole will be permitted unless approved by a qualified engineer.

Refer to Metal Pole Standard Drawing Sheets M2 through M5 for fabrication details. Fabricate anchor bases and mast arm connecting plates from plate steel meeting, as a minimum, the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr50, or an approved equivalent. Conform to the applicable bolt pattern and orientation as shown on Metal Pole Standard Drawing Sheet M2.

Ensure all hardware is galvanized steel or stainless steel. The Contractor is responsible for ensuring that the designer/fabricator specifies connecting hardware and/or materials that do not create a dissimilar metal corrosive reaction.

Provide a minimum of four (4) 1-1/2" diameter high strength bolts for connection between arm plate and pole plate. Increase number of bolts to six (6) 1-1/2" diameter high strength bolts when arm lengths are greater than 50'-0" long.

Unless otherwise required by the design, ensure each anchor rod is 2" diameter and 60" length. Provide 10" minimum thread projection at the top of the rod, and 8" minimum at the bottom of the rod. Use anchor rod assembly and drilled pier foundation materials that meet the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For each structural bolt and other steel hardware, hot dip galvanizing shall conform to the requirements of AASHTO M 232 (ASTM A 153). Ensure end caps for poles or mast arms are constructed of cast aluminum conforming to Aluminum Alloy 356.0F.

Provide a circular anchor bolt lock plate that will be secured to the anchor bolts at the embedded end with 2 washers and 2 nuts. Provide a base plate template that matches the bolt circle diameter of the anchor bolt lock plate. Construct plates and templates from 1/4" minimum thick steel with a minimum width of 4". Galvanizing is not required for both plates.

Provide 4 heavy hex nuts and 4 flat washers for each anchor bolt. For nuts, use AASHTO M291 grade 2H, DH, or DH3 or equivalent material. For flat washers, use AASHTO M293 or equivalent material.

C. Construction Methods:

Erect signal support poles only after concrete has attained a minimum allowable compressive strength of 3000 psi. Install anchor rod assemblies in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

For further construction methods, see construction methods for Metal Strain Pole, or Metal Pole with Mast Arm.

Connect poles to grounding electrodes and bond them to the electrical service grounding electrodes.

For holes in the poles used to accommodate cables, install grommets before wiring pole or arm. Do not cut or split grommets.

Attach the terminal compartment cover to the pole by a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandalism. Ensure the chain or cable will not interfere with service to the cables in the pole base.

Attach cap to pole with a sturdy chain or cable. Ensure the chain or cable is long enough to permit the cap to hang clear of the opening when the cap is removed.

Perform repair of damaged galvanizing that complies with the *Standard Specifications*, Article 1076-7 "Repair of Galvanizing."

Install galvanized wire mesh around the perimeter of the base plate to cover the gap between the base plate and top of foundation for debris and pest control.

Install a 1/4" thick plate for concrete foundation tag to include: concrete grade, depth, diameter, and reinforcement sizes of the installed foundation.

5.2. METAL POLE UPRIGHTS (VERTICAL MEMBERS)

A. Materials:

- Provide tapered tubular shafts and fabricated of steel conforming to ASTM A-595 Grade A or an approved equivalent.
- Hot-dip galvanize poles in accordance with AASHTO M 111 or an approved equivalent.
- Have shafts that are continuously welded for the entire length by the submerged arc process, and with exposed welds ground or rolled smooth and flush with the base metal. Provide welding that conforms to Article 1072-18 of the *Standard Specification* except that no field welding on any part of the pole will be permitted.
- Have Shafts with no circumferential welds except at the lower end joining the shaft to the base.
- Have anchor bases for steel poles fabricated from plate steel meeting as a minimum the requirements of ASTM A572 Gr 50, AASHTO M270 Gr 50, ASTM A709 Gr 50, or an approved equivalent.

Provide a grounding lug(s) in the approximate vicinity of the messenger cable clamp for bonding and grounding messenger cable. Lugs must accept #4 or #6 AWG wire to bond messenger cables to the pole in order to provide an effective ground fault circuit path. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

Have poles permanently stamped above the hand holes with the identification tag details as shown on Metal Pole Standard Drawing Sheet M2.

Provide liquid tight flexible metal conduit (Type LFMC), liquid tight flexible nonmetallic conduit (Type LFNC), high density polyethylene conduit (Type HDPE), or approved equivalent to isolate conductors feeding luminaires.

Fabricate poles from a single piece of steel or aluminum with single line seam weld with no transverse butt welds. Fabrication of two ply pole shafts is unacceptable with the exception of fluted shafts. Provide tapers for all shafts that begin at base and that have diameters which decrease uniformly at the rate of not more than 0.14 inch per foot (11.7 millimeters per meter) of length.

Provide four anchor nuts and four washers for each anchor bolt. Ensure that anchor bolts have required diameters, lengths, and positions, and will develop strengths comparable to their respective poles.

Provide a terminal compartment with cover and screws in each pole that encompasses the hand hole and contains a 12-terminal barrier type terminal block. Provide two terminal screws with a removable shorting bar between them for each termination. Furnish terminal compartment covers attached to the pole by a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cover to hang clear of the compartment opening when the cover is removed, and is strong enough to prevent vandals from being able to disconnect the cover from the pole. Ensure that the chain or cable will not interfere with service to the cables in the pole base.

Install grounding lugs that will accept #4 or #6 AWG wire to electrically bond messenger cables to the pole. Refer to Metal Pole Standard Drawing Sheet M6 for construction details.

For each pole, provide a 1/2 inch minimum thread diameter, coarse thread stud and nut for grounding which will accommodate #6 AWG ground wire. Ensure that the lug is electrically bonded to the pole and is conveniently located inside the pole at the hand hole.

Provide a removable pole cap with stainless steel attachment screws for the top of each pole. Ensure that the cap is cast aluminum conforming to Aluminum Association Alloy 356.0F. Furnish cap attached to the pole with a sturdy chain or cable approved by the Engineer. Ensure that the chain or cable is long enough to permit the cap to hang clear of the pole-top opening when the cap is removed.

When required by the plans, furnish couplings 42 inches above the bottom of the base for mounting of pedestrian pushbuttons. Provide mounting points consisting of 1-1/2 inch internally threaded half-couplings that comply with the NEC and that are mounted within the poles. Ensure that couplings are essentially flush with the outside surfaces of the poles and are installed before any required galvanizing. Provide a threaded plug in each mounting point. Ensure that the surface of the plug is essentially flush with the outer end of the mounting point when installed and has a recessed hole to accommodate a standard wrench.

1. STRAIN POLE SHAFTS

Provide 2 messenger cable (span wire) clamps and associated hardware for attachment of messenger cable. Ensure that diameter of the clamp is appropriate to its location on the pole and is appropriately designed to be adjustable from 1'-6" below the top, down to 6'-6" below the top of the pole. Do not attach more than one support cable to a messenger cable clamp.

Provide a minimum of three (3) 2 inch (50 mm) holes equipped with an associated coupling and weatherhead on the messenger cable load side of the pole to accommodate passage of signal cables from inside the pole. Provide galvanized threaded plugs for all unused couplings at pole entrance points. Refer to Metal Pole Standard Drawing Sheet M3 for fabrication details.

Ensure that allowable pole deflection does not exceed that allowed per 6th Edition AASHTO. Ensure maximum deflection at the top of the pole does not exceed 2.5 percent of the pole height.

B. Construction Methods:

Install metal poles, hardware, and fittings as shown on the manufacturer's installation drawings. Install metal poles so that when the pole is fully loaded it is within 1 degree 40 minutes (1°40') of vertical. Install poles with the manufacturer's recommended "rake." Use threaded leveling nuts to establish rake if required.

5.3. DRILLED PIER FOUNDATIONS FOR METAL TRAFFIC SIGNAL POLES

Analysis procedures and formulas shall be based on AASHTO 6th Edition, latest ACI code and the *Drilled Shafts: Construction Procedures and Design Methods* FHWA-NHI-10-016 manual. Design methods based on engineering publications or research papers needs to have prior approval from NCDOT. The Department reserves the right to accept or disapprove any method used for the analysis.

Use a Factor of Safety of 1.33 for torsion and 2.0 for bending for the foundation design.

Foundation design for lateral load shall not exceed 1" lateral deflection at top of foundation.

For lateral analysis, use LPILE Plus V6.0 or later. Inputs, results and corresponding graphs are to be submitted with the design calculations.

Skin Friction is to be calculated using the α -method for cohesive soils and the β -method for cohesion-less soils (**Broms method will not be accepted**). Detailed descriptions of the “ α ” and “ β ” methods can be found in *FHWA-NHI-10-016*.

Omit first 2.5ft for cohesive soils when calculating skin friction.

When hammer efficiency is not provided, assume a value of 0.70.

Design all custom foundations to carry the maximum capacity of each metal pole. For standard case strain poles only, if a custom foundation is designed, use the actual shear, axial and moment reactions from the Standard Foundation Selection Table shown on Standard Drawing No. M8.

When poor soil conditions are encountered which could create an excessively large foundation design, consideration may be given to allowing an exemption to the maximum capacity design. The contractor must gain approval from the engineer before reducing a foundation's capacity. On projects where poor soil is known to be present, it is advisable that the contractor consider getting foundations approved before releasing poles for fabrication.

Have the contractor notify the engineer if the proposed foundation is to be installed on a slope other than 8H: 1V or flatter.

A. Description:

Furnish and install foundations for NCDOT metal poles with all necessary hardware in accordance with the plans and specifications.

Metal Pole Standards have been developed and implemented by NCDOT for use at signalized intersections in North Carolina. If the plans call for a standard pole, then a standard foundation may be selected from the plans. However, the Contractor is not required to use a standard foundation. If the Contractor chooses to design a non-standard site-specific foundation for a standard pole or if the plans call for a non-standard site-specific pole, design the foundation to conform to the applicable provisions in the NCDOT Metal Pole Standard Drawings and Section B7 (Non-Standard Foundation Design) below. If non-standard site specific foundations are designed for standard QPL approved strain poles, the foundation designer must use the design moment specified by load case on Metal Pole Standard Drawing Sheet M8. Failure to conform to this requirement will be grounds for rejection of the design.

If the Contractor chooses to design a non-standard foundation for a standard pole and the soil test results indicate a standard foundation is feasible for the site, the Contractor will be paid the cost of the standard foundation (drilled pier and wing wall, if applicable). Any additional costs associated with a non-standard site-specific foundation including additional materials, labor and equipment will be considered incidental to the cost of the standard foundation. All costs for the non-standard foundation design will also be considered incidental to the cost of the standard foundation.

B. Soil Test and Foundation Determination:

1. General:

Drilled piers are reinforced concrete sections, cast-in-place against in situ, undisturbed material. Drilled piers are of straight shaft type and vertical.

Some standard drilled piers for supporting poles with mast arms may require wing walls to resist torsional rotation. Based upon this provision and the results of the required soil test, a drilled pier length and wing wall requirement may be determined and constructed in accordance with the plans.

For non-standard site-specific poles, the contractor-selected pole fabricator will determine if the addition of wing walls is necessary for the supporting foundations.

2. Soil Test:

Perform a soil test at each proposed metal pole location. Complete all required fill placement and excavation at each signal pole location to finished grade before drilling each boring. Soil tests performed that are not in compliance with this requirement may be rejected and will not be paid. Drill one boring to a depth of 26 feet within a 25 foot radius of each proposed foundation.

Perform standard penetration tests (SPT) in accordance with ASTM D 1586 at depths of 1, 2.5, 5, 7.5, 10, 15, 20 and 26 feet. Discontinue the boring if one of the following occurs:

- A total of 100 blows have been applied in any 2 consecutive 6-in. intervals.
- A total of 50 blows have been applied with < 3-in. penetration.

Describe each intersection as the “Intersection of (Route or SR #), (Street Name) and (Route or SR #), (Street Name), _____ County, Signal Inventory No. _____”. Label borings with “B- N, S, E, W, NE, NW, SE or SW” corresponding to the quadrant location within the intersection. Pole numbers should be made available to the Drill Contractor. Include pole numbers in the boring label if they are available. If they are not available, ensure the boring labels can be cross-referenced to corresponding pole numbers. For each boring, submit a legible (hand written or typed) boring log signed and sealed by a licensed Geologist or Professional Engineer registered in North Carolina. Include on each boring the SPT blow counts and N-values at each depth, depth of the boring, hammer efficiency, depth of water table and a general description of the soil types encountered using the AASHTO Classification System.

3. Standard Foundation Determination:

Use the following method for determining the Design N-value:

$$N_{AVG} = \frac{(N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})}{\text{Total Number of N-values}}$$

$$Y = (N@1')^2 + (N@2.5')^2 + \dots + (N@Deepest \text{ Boring Depth})^2$$

$$Z = (N@1' + N@2.5' + \dots + N@Deepest \text{ Boring Depth})$$

$$N_{STD \text{ DEV}} = \left[\frac{(\text{Total Number of N-values} \times Y) - Z^2}{(\text{Total Number of N-values}) \times (\text{Total Number of N-values} - 1)} \right]^{0.5}$$

Design N-value equals lesser of the following two conditions:

$$N_{AVG} - (N_{STD \text{ DEV}} \times 0.45)$$

Or

$$\text{Average of First Four N-Values} = \frac{(N@1' + N@2.5' + N@5' + N@7.5')}{4}$$

Note: If less than 4 N-values are obtained because of criteria listed in Section 2 above, use average of N-values collected for second condition. Do not include the N-value at the deepest boring depth for above calculations if the boring is discontinued at or before the required boring depth because of criteria listed in Section 2 above. Use N-value of zero for weight of hammer or weight of rod. If N-value is greater than 50, reduce N-value to 50 for calculations.

If standard NCDOT strain poles are shown on the plans and the Contractor chooses to use standard foundations, determine a drilled pier length, "L," for each signal pole from the Standard Foundations Chart (sheet M 8) based on the Design N-value and the predominant soil type. For each standard pole location, submit a completed "Metal Pole Standard Foundation Selection Form" signed by the Contractor's representative. Signature on form is for verification purposes only. Include the Design N-value calculation and resulting drilled pier length, "L," on each form.

If non-standard site-specific poles are shown on the plans, submit completed boring logs collected in accordance with Section 2 (Soil Test) above along with pole loading diagrams from the plans to the contractor-selected pole fabricator to assist in the pole and foundation design.

If one of the following occurs, the Standard Foundations Chart shown on the plans may not be used and a non-standard foundation may be required. In such case, contact the Engineer.

- The Design N-value is less than 4.
- The drilled pier length, "L", determined from the Standard Foundations Chart, is greater than the depth of the corresponding boring.

In the case where a standard foundation cannot be used, the Department will be responsible for the additional cost of the non-standard foundation.

Foundation designs are based on level ground around the traffic signal pole. If the slope around the edge of the drilled pier is steeper than 8:1 (H:V) or the proposed foundation will be less than 10 feet from the top of an embankment slope, the Contractor is responsible for providing slope information to the foundation designer and to the Engineer so it can be considered in the design.

The "Metal Pole Standard Foundation Selection Form" may be found at:

<http://www.ncdot.gov/doh/preconstruct/highway/geotech/formdet/misc/MetalPole.pdf>

If assistance is needed, contact the Engineer.

4. Non-Standard Foundation Design:

Design non-standard foundations based upon site-specific soil test information collected in accordance with Section 2 (Soil Test) above. Design drilled piers for side resistance only in accordance with Section 4.6 of the *AASHTO Standard Specifications for Highway Bridges*. Use the computer software LPILE version-6.0 or later manufactured by Ensoft, Inc. to analyze drilled piers. Use the computer software gINT V8i or later manufactured by Bentley Systems, Inc. with the current NCDOT gINT library and data template to produce SPT boring logs. Provide a drilled pier foundation for each pole with a length and diameter that result in a horizontal lateral movement of less than 1 inch at the top of the pier and a horizontal rotational movement of less than 1 inch at the edge of the pier. Contact the Engineer for pole loading diagrams for standard poles to be used for

non-standard foundation designs. Submit any non-standard foundation designs including drawings, calculations, and soil boring logs to the Engineer for review and approval before construction.

C. Drilled Pier Construction:

Construct drilled pier foundations in accordance with the *Foundations and Anchor Rod Assemblies for Metal Poles* provision.

5.4. POLE NUMBERING SYSTEM

A. New Poles

Attach an identification tag to each pole shaft and mast arm section as shown on Metal Pole Standard Drawing Sheet M2 "Typical Fabrication Details Common To All Metal Poles".

5.5. MEASUREMENT AND PAYMENT

Actual number of metal strain signal poles (without regard to height or load capacity) furnished, installed and accepted.

Actual number of soil tests with SPT borings drilled furnished and accepted.

Actual volume of concrete poured in cubic yards of drilled pier foundation furnished, installed and accepted.

No measurement will be made for foundation designs prepared with metal pole designs, as these will be considered incidental to designing signal support structures.

Payment will be made under:

Metal Strain Signal Pole	Each
Soil Test	Each
Drilled Pier Foundation.....	Cubic Yard

6. BACK PULL FIBER OPTIC CABLE

6.1. DESCRIPTION

Back pull and store or back pull and reinstall existing communications cable.

6.1. CONSTRUCTION

During project construction where instructed to back pull existing aerial sections of fiber optic communications cable, de-lash the cable from the messenger cable and back pull the cable to a point where it can be stored or re-routed as shown on the plans. If instructed, remove and discard the existing messenger cable and pole mounting hardware once the cable is safely out of harm's way.

During project construction where instructed to back pull existing underground sections of fiber optic communications cable, back pull the cable to a point where it can be stored or re-routed as shown on the plans. If instructed, remove abandoned junction boxes and backfill with a suitable material to match the existing grade. Leave abandoned conduits in place unless otherwise noted.

Where instructed, re-pull the fiber optic cable back along messenger cable or through conduit systems.

6.2. MEASUREMENT AND PAYMENT

Back Pull Fiber Optic Cable will be paid for as the actual linear feet of fiber optic cable back pulled and either stored or back pulled and rerouted. Payment is for the actual linear feet of cable back pulled.

No payment will be made for removing messenger cable and pole mounting hardware or removing junction boxes and back filling to match the surrounding grade as these items of work will be considered incidental to back pulling the fiber optic cable.

Payment will be made under:

Back Pull Fiber Optic Cable Linear Feet

Project R-2530B

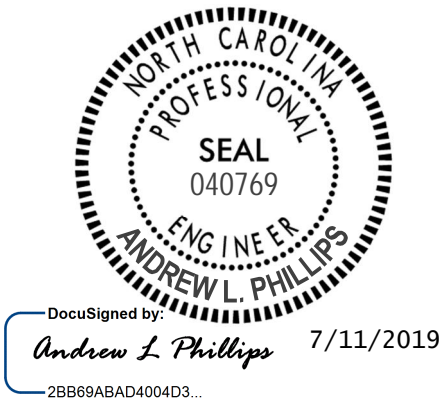
ST-1

Stanly County
Montgomery County

Project Special Provisions
Culverts

Table of Contents

	<u>Page No.</u>
Optional Precast Reinforced Concrete Box Culvert at Station (12-12-13) -----	ST-2
Falsework and Formwork (4-5-12) -----	ST-9
Submittal of Working Drawings (6-28-17) -----	ST-15
Crane Safety (6-20-19) -----	ST-21
Grout for Structures (12-1-17) -----	ST-22



Project R-2530B

ST-2Stanly County
Montgomery County
(12-12-13)**OPTIONAL PRECAST REINFORCED CONCRETE
BOX CULVERT AT STATION****1.0 GENERAL**

This Special Provision covers the design, fabrication and construction of precast reinforced concrete box culverts intended for the conveyance of storm water.

If the option is indicated on the plans, the submittal for a precast reinforced box culvert in lieu of a cast-in-place culvert is permitted. Design the precast culvert sections in accordance with ASTM C1577 or the current edition of the AASHTO LRFD Bridge Design Specifications. Rate all sizes of precast reinforced concrete box culverts in accordance with the current edition of the AASHTO Manual for Bridge Evaluation. Ensure the culvert rates for the AASHTO design loads and North Carolina's legal loads (see Section 2.0 for North Carolina's legal loads). Provide the size and number of barrels as indicated on the plans. Detail the culvert with cast-in-place wings walls and footings. Precast wing walls and footings will not be allowed. Provide a precast box culvert that meets the requirements of Section 1077 and any other applicable parts of the Standard Specifications.

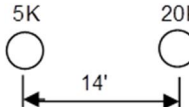
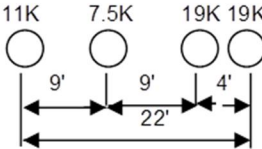
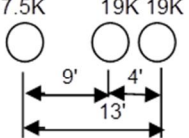
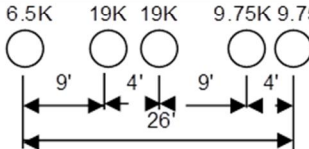
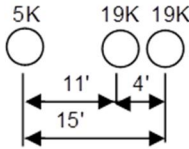
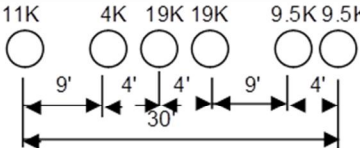
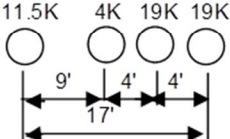
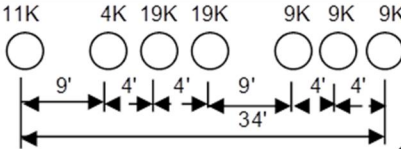
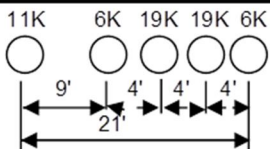
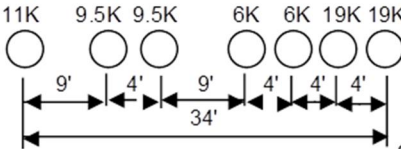
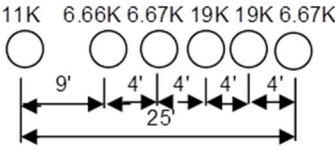
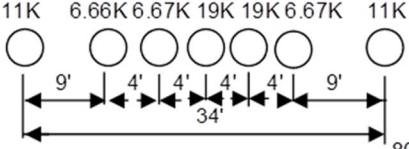
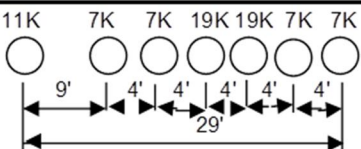
The design and rating of the precast and cast-in-place members is the responsibility of the Contractor and is subject to review, comments and approval. Submit two sets of detailed plans and rating sheets for review. Include all details in the plans, including the size and spacing of the required reinforcement necessary to build the precast box and cast-in-place members. Have a North Carolina Registered Professional Engineer check and seal the plans, rating sheets and design calculations. After the plans, rating sheets and design calculations are reviewed and, if necessary, the corrections made, submit one set of plans and rating sheets on 22" x 34" sheets to become part of the contract plans.

If the span, rise and design earth cover for the precast reinforced concrete box culvert are identical to a previously approved submittal, the Contractor may request the previously approved design calculations and plans be considered as the submittal for review and approval. However, a set of plans and rating sheets will need to be submitted to become part of the contract plans.

Project R-2530B

ST-3Stanly County
Montgomery County**2.0 NORTH CAROLINA'S LEGAL LOADS**

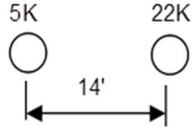
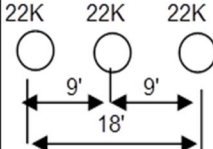
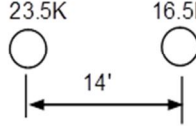
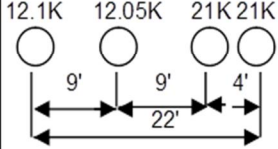
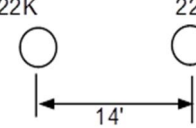
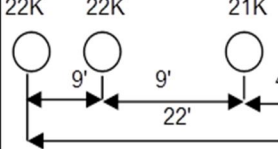
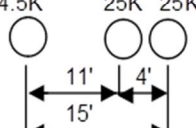
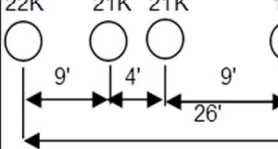
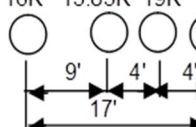
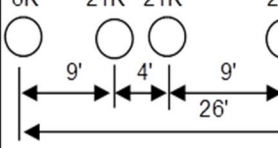
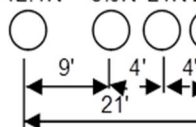
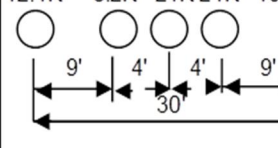
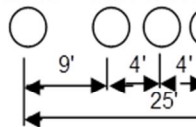
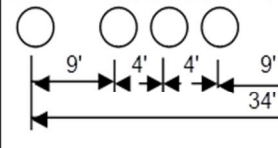
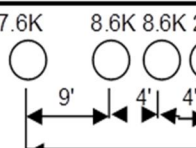
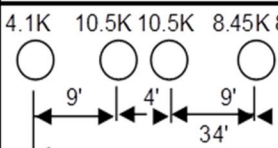
Apply the following legal loads to all structures carrying interstate traffic:

SINGLE VEHICLE(SV)		TRUCK TRACTOR SEMI-TRAILER(TTS T)	
REF. #	SCHEMATIC	REF. #	SCHEMATIC
SH		T4A	
S3A		T5B	
S3C		T6A	
S4A		T7A	
S5A		T7B	
S6A			
S7A			
S7B			

Project R-2530B

ST-4Stanly County
Montgomery County

Apply the following legal loads to all structures carrying non-interstate traffic:

SINGLE VEHICLE (SV)			TRUCK TRACTOR SEMI-TRAILER (TTST)		
REF. #	SCHEMATIC		REF. #	SCHEMATIC	
SNSH		27K 13.5 TON	TNAGRIT3		33 Ton
SNGARBS2		40K 20 TON	TNT4A		66.15K 33.075 TON
SNAGRIS2		44K 22 Ton	TNAGRIT4		86K 43 TON
SNCOTTS3		54.5K 27.25 TON	TNAGT5A		90K 45 TON
SNAGGRS4		69.85K 34.925 TON	TNAGT5B		90K 45 TON
SNS5A		71.1K 35.55 TON	TNT6A		83.2K 41.6 TON
SNS6A		79.9K 39.95 TON	TNT7A		84K 42 TON
SNS7B		84K 42 TON	TNT7B		84K 42 TON

Project R-2530B

ST-5Stanly County
Montgomery County**3.0 PRECAST REINFORCED CONCRETE BOX SECTIONS**

The precast reinforced concrete box culvert sections shall match the size and hydraulic opening indicated in the contract plans.

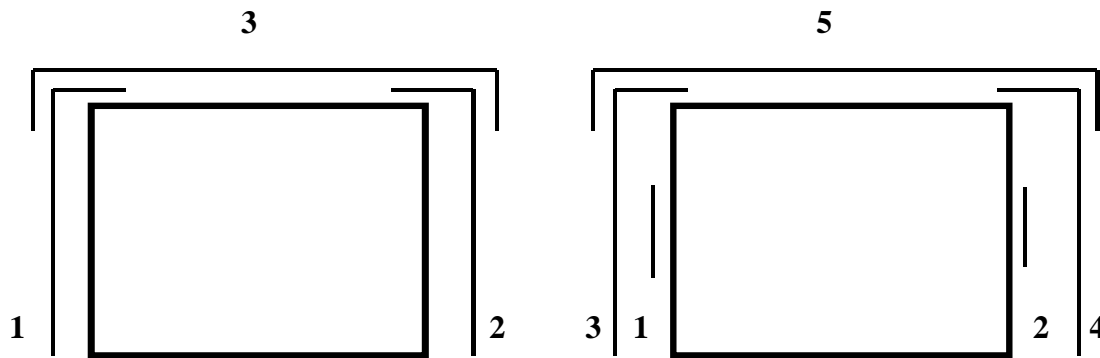
A. Design

1. Design Fill – The design earth cover is reported on the plans as the elevation difference between the point of maximum fill and the bottom of the top slab.
2. Placement of Reinforcement – Provide a 1 inch concrete cover over the reinforcement subject to the provisions of Section F. Extend the inside reinforcement into the tongue portion of the joint and the outside reinforcement into the groove portion of the joint. Detail the clear distance of the end wires so it is not less than 1/2 inch or more than 2 inches from the ends of the box section. Assemble reinforcement per the requirements of ASTM C1577 or the approved design. The exposure of the ends of the wires used to position the reinforcement is not a cause for rejection.
3. Laps and Spacing – Use lap splices for the transverse reinforcement. Detail the transverse wires so that the center to center spacing is not less than 2 inches or more than 4 inches. Do not detail the longitudinal wires with a center to center spacing of more than 8 inches.

B. Joints

1. Produce the precast reinforced concrete box section with tongue and groove ends. Design and form these ends of the box section so, when the sections are laid together, they make a continuous line of box sections with a smooth interior free of appreciable irregularities in the flowline, all compatible with the permissible variations given in Section F. The internal joint formed at the tongue and groove ends of the precast units shall be sealed with either bitumen/butyl sealant or closed-cell neoprene material. The internal joint material shall be installed in accordance with the manufacturer's recommendations. The material shall be shown on the shop drawings when they are submitted for review.
2. Seal the external joint with an outside sealer wrap conforming to ASTM C877 that is at least 12 inches wide and covers the joint on both the sides and the top of the box section. Use ConWrap CS-212 from Concrete Sealants, Inc., EZ-Wrap from Press-Seal Gasket Corporation, Seal Wrap from Mar-Mac Manufacturing Co., Inc., Cadilloc External Pipe Joint from Cadilloc, or an approved equal for the outside sealer wrap. If the outside sealer wrap is not applied in a continuous strip along the entire joint, a 12 inch minimum lap of the outside sealer wrap is permitted. Before placing the outside sealer wrap, clean and prime the area receiving the outside sealer wrap in accordance with the sealer wrap manufacturer recommendations. The joint wrap manufacturer installation recommendations shall be included with shop drawings submitted for review. The external joint wrap shall be installed in pieces, as indicated on Figure 1 below:

Project R-2530B

ST-6Stanly County
Montgomery County**Figure 1**

Cover the external joint sealer with a 3 foot strip of filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications.

Place multiple lines of a precast reinforced concrete box culvert such that the longitudinal joint between the sections has a minimum width of 3 inches. Fill the joint between multiple lines of precast box sections with Class A concrete. Use Class A concrete that meets the requirements listed in the Standard Specifications except that Field Compressive Strength Specimens are not required.

C. Manufacture

Manufacture precast reinforced concrete box culvert sections by either the wet cast method or dry cast method.

1. Mixture – In addition to the requirements of Section 1077 of the Standard Specifications, do not proportion the mix with less than 564 lb/yd³ of portland cement.
2. Strength – Concrete shall develop a minimum 28-day compressive strength of 5000 psi. Movement of the precast sections should be minimized during the initial curing period. Any damage caused by moving or handling during the initial curing phase will be grounds for rejection of that precast section.
3. Air Entrainment – Air entrain the concrete in accordance with Section 1077 - 5(A) of the Standard Specifications. For dry cast manufacturing, air entrainment is not required.
4. Testing – Test the concrete in accordance with the requirements of Section 1077 - 5(B).

Project R-2530B

ST-7Stanly County
Montgomery County

5. Handling – Handling devices or holes are permitted in each box section for the purpose of handling and placing. Submit details of handling devices or holes for approval and do not cast any concrete until approval is granted. Remove all handling devices flush with concrete surfaces as directed. Fill holes in a neat and workmanlike manner with an approved non-metallic non-shrink grout, concrete, or hole plug.

D. Physical Requirements

Acceptability of precast culvert sections is based on concrete cylinders made and tested in accordance with ASTM C31 and ASTM C39.

E. Permissible Variations

1. Flatness – All external surfaces shall be flat, true, and plumb. Irregularities, depressions, or high spots on all external surfaces shall not exceed 1/2 inch in 8 feet.
2. Internal Dimensions – Produce sections so that the internal and haunch dimensions do not vary more than 1/4 inch from the plan dimensions.
3. Adjacent Sections - Internal, external, and haunch dimensions for connecting sections shall not vary more than 1/2 inch.
4. Length of Tongue and Groove – The minimum length of the tongue shall be 4 inches. The minimum length of the groove shall be 4 inches. The dimensions of the tongue and groove shall not vary more than 1/4 inch from the plan dimensions.
5. Slab and Wall Thickness – Produce sections so that the slab and wall thickness are not less than that shown on the plans by more than 5% or 3/16 inch, whichever is greater. A thickness more than that required on the plans is not a cause for rejection.
6. Length of Opposite Surfaces – Produce sections so that variations in laying lengths of two opposite surfaces of the box section meet the requirements of ASTM C1577, Section 11.3.
7. Length of Section – Produce sections so that the underrun in length of a section is not more than 1/2 inch in any box section.
8. Position of Reinforcement – Produce sections so that the maximum variation in the position of the reinforcement is $\pm 3/8$ inch for slab and wall thicknesses of 5 inches or less and $\pm 1/2$ inch for slab and wall thicknesses greater than 5 inches. Produce sections so that the concrete cover is never less than 5/8 inch as measured to the internal surface or the external surface. The preceding minimum cover limitations do not apply at the mating surfaces of the joint.
9. Area of Reinforcement – Use the design steel shown on the plans for the steel reinforcement. Steel areas greater than those required are not cause for rejection. The permissible variation in diameter of any wire in finished fabric is prescribed for the wire before fabrication by either AASHTO M32 or M225.

Project R-2530B

ST-8Stanly County
Montgomery County**F. Marking**

1. Each section shall be match-marked in order of intended installation as indicated on the approved shop drawings. Ensure that pieces fit together neatly and in a workmanlike manner. In order to ensure a good, neat field fit, the Department will verify assembly of the first five adjacent sections or 20% of the total culvert length, whichever is greater, at the producer's facility and match-mark the pieces. This will require that a minimum of three adjacent sections of the culvert be fitted at the production yard at a time and then match-marked. Once three sections have been match-marked, the first section may be removed for shipment and a fourth section set for marking. Continue in a progressive manner until all sections have been properly match-marked. The producer shall document the GO-NO-GO dimensional measurements of each box culvert section produced through the post-pour inspection process.
2. Clearly mark each section of the box culvert in accordance with ASTM C1577, Section 15. The information requirements of Section 15.1 shall be clearly marked on the inner surface of each section.

G. Construction

1. Pre-installation Meeting – A pre-installation meeting is required prior to installation. Representatives from the Contractor, the precast box manufacturer, and the Department should attend this meeting. The precast box manufacturer representative shall be on site during installation.
2. Foundation – Foundation for precast box culvert shall meet the requirements of Section 414 of the Standard Specifications. In addition, Type VI foundation material shall be encapsulated in filter fabric conforming to Type 4 requirements in Section 1056 of the Standard Specifications. The filter fabric shall be placed perpendicular to the culvert barrel. Provide sufficient overhang beyond the excavation to allow a minimum lap of 3 feet when the foundation material is placed and fabric wrapped on top. Perpendicular sections of fabric shall be continuous. A minimum lap of 2 feet shall be provided between sections of fabric.
3. Installation – Sections shall be placed at the beginning of the outlet end of the culvert with the groove end being laid up grade. Tongue sections shall be laid into the groove sections. Positive means shall be provided to pull each section firmly into the previously placed section so that the joints are tightly homed. Use a "come-along", box pullers or other approved methods to create a positive means of joining box sections. Construction equipment shall not have direct contact with the box section. The load of the box shall be suspended by lifting device during joining procedure.
4. Backfill – Complete backfill in accordance with Section 414 of the Standard Specifications.

Project R-2530B

ST-9Stanly County
Montgomery County**4.0 BASIS OF PAYMENT**

Any additional cost of redesigning will be paid for by the Contractor if Precast Reinforced Concrete Culvert is used in lieu of the cast-in-place culvert shown on the plans. Except for Foundation Conditioning Material and Culvert Excavation, payment for the Precast Box Culvert will be a lump sum amount equal to the payment that would be allowed for construction of a Cast-in-Place Box Culvert. Plan quantities and unit bid prices will be used to compute the lump sum amount. Such price and payment will be full compensation for all work covered by this Special Provision, the plans and applicable parts of the Standard Specifications and will include, but not be limited to, furnishing all labor, materials (including all filter fabric), equipment and other incidentals necessary to complete this work. Such price and payment will also be full compensation for concrete, reinforcing steel, labor, equipment and all other related materials necessary for the completion of the barrel section, and the construction of the headwalls, leveling pad, end curtain walls, wings and wing footings.

FALSEWORK AND FORMWORK**(4-5-12)****1.0 DESCRIPTION**

Use this Special Provision as a guide to develop temporary works submittals required by the Standard Specifications or other provisions; no additional submittals are required herein. Such temporary works include, but are not limited to, falsework and formwork.

Falsework is any temporary construction used to support the permanent structure until it becomes self-supporting. Formwork is the temporary structure or mold used to retain plastic or fluid concrete in its designated shape until it hardens. Access scaffolding is a temporary structure that functions as a work platform that supports construction personnel, materials, and tools, but is not intended to support the structure. Scaffolding systems that are used to temporarily support permanent structures (as opposed to functioning as work platforms) are considered to be falsework under the definitions given. Shoring is a component of falsework such as horizontal, vertical, or inclined support members. Where the term “temporary works” is used, it includes all of the temporary facilities used in bridge construction that do not become part of the permanent structure.

Design and construct safe and adequate temporary works that will support all loads imposed and provide the necessary rigidity to achieve the lines and grades shown on the plans in the final structure.

2.0 MATERIALS

Select materials suitable for temporary works; however, select materials that also ensure the safety and quality required by the design assumptions. The Engineer has authority to reject material on the basis of its condition, inappropriate use, safety, or nonconformance with the plans. Clearly identify allowable loads or stresses for all materials or manufactured devices

Project R-2530B

ST-10Stanly County
Montgomery County

on the plans. Revise the plan and notify the Engineer if any change to materials or material strengths is required.

3.0 DESIGN REQUIREMENTS**A. Working Drawings**

Provide working drawings for items as specified in the contract, or as required by the Engineer, with design calculations and supporting data in sufficient detail to permit a structural and safety review of the proposed design of the temporary work.

On the drawings, show all information necessary to allow the design of any component to be checked independently as determined by the Engineer.

When concrete placement is involved, include data such as the drawings of proposed sequence, rate of placement, direction of placement, and location of all construction joints. Submit the number of copies as called for by the contract.

When required, have the drawings and calculations prepared under the guidance of, and sealed by, a North Carolina Registered Professional Engineer who is knowledgeable in temporary works design.

If requested by the Engineer, submit with the working drawings manufacturer's catalog data listing the weight of all construction equipment that will be supported on the temporary work. Show anticipated total settlements and/or deflections of falsework and forms on the working drawings. Include falsework footing settlements, joint take-up, and deflection of beams or girders.

As an option for the Contractor, overhang falsework hangers may be uniformly spaced, at a maximum of 36 inches, provided the following conditions are met:

Member Type (PCG)	Member Depth, (inches)	Max. Overhang Width, (inches)	Max. Slab Edge Thickness, (inches)	Max. Screenshot Wheel Weight, (lbs.)	Bracket Min. Vertical Leg Extension, (inches)
II	36	39	14	2000	26
III	45	42	14	2000	35
IV	54	45	14	2000	44
MBT	63	51	12	2000	50
MBT	72	55	12	1700	48

Overhang width is measured from the centerline of the girder to the edge of the deck slab.

Project R-2530B

ST-11Stanly County
Montgomery County

For Type II, III & IV prestressed concrete girders (PCG), 45-degree cast-in-place half hangers and rods must have a minimum safe working load of 6,000 lbs.

For MBT prestressed concrete girders, 45-degree angle holes for falsework hanger rods shall be cast through the girder top flange and located, measuring along the top of the member, 1'-2 1/2" from the edge of the top flange. Hanger hardware and rods must have a minimum safe working load of 6,000 lbs.

The overhang bracket provided for the diagonal leg shall have a minimum safe working load of 3,750 lbs. The vertical leg of the bracket shall extend to the point that the heel bears on the girder bottom flange, no closer than 4 inches from the bottom of the member. However, for 72-inch members, the heel of the bracket shall bear on the web, near the bottom flange transition.

Provide adequate overhang falsework and determine the appropriate adjustments for deck geometry, equipment, casting procedures and casting conditions.

If the optional overhang falsework spacing is used, indicate this on the falsework submittal and advise the girder producer of the proposed details. Failure to notify the Engineer of hanger type and hanger spacing on prestressed concrete girder casting drawings may delay the approval of those drawings.

Falsework hangers that support concentrated loads and are installed at the edge of thin top flange concrete girders (such as bulb tee girders) shall be spaced so as not to exceed 75% of the manufacturer's stated safe working load. Use of dual leg hangers (such as Meadow Burke HF-42 and HF-43) are not allowed on concrete girders with thin top flanges. Design the falsework and forms supporting deck slabs and overhangs on girder bridges so that there will be no differential settlement between the girders and the deck forms during placement of deck concrete.

When staged construction of the bridge deck is required, detail falsework and forms for screed and fluid concrete loads to be independent of any previous deck pour components when the mid-span girder deflection due to deck weight is greater than 3/4".

Note on the working drawings any anchorages, connectors, inserts, steel sleeves or other such devices used as part of the falsework or formwork that remains in the permanent structure. If the plan notes indicate that the structure contains the necessary corrosion protection required for a Corrosive Site, epoxy coat, galvanize or metalize these devices. Electroplating will not be allowed. Any coating required by the Engineer will be considered incidental to the various pay items requiring temporary works.

Design falsework and formwork requiring submittals in accordance with the 1995 AASHTO *Guide Design Specifications for Bridge Temporary Works* except as noted herein.

1. Wind Loads

Project R-2530B

ST-12Stanly County
Montgomery County

Table 2.2 of Article 2.2.5.1 is modified to include wind velocities up to 110 mph. In addition, Table 2.2A is included to provide the maximum wind speeds by county in North Carolina.

Table 2.2 - Wind Pressure Values

Height Zone feet above ground	Pressure, lb/ft ² for Indicated Wind Velocity, mph				
	70	80	90	100	110
0 to 30	15	20	25	30	35
30 to 50	20	25	30	35	40
50 to 100	25	30	35	40	45
over 100	30	35	40	45	50

2. Time of Removal

The following requirements replace those of Article 3.4.8.2.

Do not remove forms until the concrete has attained strengths required in Article 420-16 of the Standard Specifications and these Special Provisions.

Do not remove forms until the concrete has sufficient strength to prevent damage to the surface.

Project R-2530B

ST-13Stanly County
Montgomery County**Table 2.2A - Steady State Maximum Wind Speeds by Counties in North Carolina**

COUNTY	25 YR (mph)	COUNTY	25 YR (mph)	COUNTY	25 YR (mph)
Alamance	70	Franklin	70	Pamlico	100
Alexander	70	Gaston	70	Pasquotank	100
Alleghany	70	Gates	90	Pender	100
Anson	70	Graham	80	Perquimans	100
Ashe	70	Granville	70	Person	70
Avery	70	Greene	80	Pitt	90
Beaufort	100	Guilford	70	Polk	80
Bertie	90	Halifax	80	Randolph	70
Bladen	90	Harnett	70	Richmond	70
Brunswick	100	Haywood	80	Robeson	80
Buncombe	80	Henderson	80	Rockingham	70
Burke	70	Hertford	90	Rowan	70
Cabarrus	70	Hoke	70	Rutherford	70
Caldwell	70	Hyde	110	Sampson	90
Camden	100	Iredell	70	Scotland	70
Carteret	110	Jackson	80	Stanley	70
Caswell	70	Johnston	80	Stokes	70
Catawba	70	Jones	100	Surry	70
Cherokee	80	Lee	70	Swain	80
Chatham	70	Lenoir	90	Transylvania	80
Chowan	90	Lincoln	70	Tyrell	100
Clay	80	Macon	80	Union	70
Cleveland	70	Madison	80	Vance	70
Columbus	90	Martin	90	Wake	70
Craven	100	McDowell	70	Warren	70
Cumberland	80	Mecklenburg	70	Washington	100
Currituck	100	Mitchell	70	Watauga	70
Dare	110	Montgomery	70	Wayne	80
Davidson	70	Moore	70	Wilkes	70
Davie	70	Nash	80	Wilson	80
Duplin	90	New Hanover	100	Yadkin	70
Durham	70	Northampton	80	Yancey	70
Edgecombe	80	Onslow	100		

Project R-2530B

ST-14Stanly County
Montgomery County

Forsyth	70	Orange	70		
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B. Review and Approval

The Engineer is responsible for the review and approval of temporary works' drawings.

Submit the working drawings sufficiently in advance of proposed use to allow for their review, revision (if needed), and approval without delay to the work.

The time period for review of the working drawings does not begin until complete drawings and design calculations, when required, are received by the Engineer.

Do not start construction of any temporary work for which working drawings are required until the drawings have been approved. Such approval does not relieve the Contractor of the responsibility for the accuracy and adequacy of the working drawings.

4.0 CONSTRUCTION REQUIREMENTS

All requirements of Section 420 of the Standard Specifications apply.

Construct temporary works in conformance with the approved working drawings. Ensure that the quality of materials and workmanship employed is consistent with that assumed in the design of the temporary works. Do not weld falsework members to any portion of the permanent structure unless approved. Show any welding to the permanent structure on the approved construction drawings.

Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement. Make sure that the anticipated compressive settlement and/or deflection of falsework does not exceed 1 inch. For cast-in-place concrete structures, make sure that the calculated deflection of falsework flexural members does not exceed 1/240 of their span regardless of whether or not the deflection is compensated by camber strips.

A. Maintenance and Inspection

Inspect and maintain the temporary work in an acceptable condition throughout the period of its use. Certify that the manufactured devices have been maintained in a condition to allow them to safely carry their rated loads. Clearly mark each piece so that its capacity can be readily determined at the job site.

Perform an in-depth inspection of an applicable portion(s) of the temporary works, in the presence of the Engineer, not more than 24 hours prior to the beginning of each concrete placement. Inspect other temporary works at least once a month to ensure that they are functioning properly. Have a North Carolina Registered Professional Engineer inspect the cofferdams, shoring, sheathing, support of excavation structures, and support systems for load tests prior to loading.

Project R-2530B

ST-15Stanly County
Montgomery County**B. Foundations**

Determine the safe bearing capacity of the foundation material on which the supports for temporary works rest. If required by the Engineer, conduct load tests to verify proposed bearing capacity values that are marginal or in other high-risk situations.

The use of the foundation support values shown on the contract plans of the permanent structure is permitted if the foundations are on the same level and on the same soil as those of the permanent structure.

Allow for adequate site drainage or soil protection to prevent soil saturation and washout of the soil supporting the temporary works supports.

If piles are used, the estimation of capacities and later confirmation during construction using standard procedures based on the driving characteristics of the pile is permitted. If preferred, use load tests to confirm the estimated capacities; or, if required by the Engineer conduct load tests to verify bearing capacity values that are marginal or in other high risk situations.

The Engineer reviews and approves the proposed pile and soil bearing capacities.

5.0 REMOVAL

Unless otherwise permitted, remove and keep all temporary works upon completion of the work. Do not disturb or otherwise damage the finished work.

Remove temporary works in conformance with the contract documents. Remove them in such a manner as to permit the structure to uniformly and gradually take the stresses due to its own weight.

6.0 METHOD OF MEASUREMENT

Unless otherwise specified, temporary works will not be directly measured.

7.0 BASIS OF PAYMENT

Payment at the contract unit prices for the various pay items requiring temporary works will be full compensation for the above falsework and formwork.

SUBMITTAL OF WORKING DRAWINGS**(6-28-17)****1.0 GENERAL**

Submit working drawings in accordance with Article 105-2 of the *Standard Specifications* and this provision. For this provision, “submittals” refers to only those listed in this provision. The list of submittals contained herein does not represent a list of required submittals for the project. Submittals are only necessary for those items as required by the

Project R-2530B

ST-16Stanly County
Montgomery County

contract. Make submittals that are not specifically noted in this provision directly to the Engineer. Either the Structures Management Unit or the Geotechnical Engineering Unit or both units will jointly review submittals.

If a submittal contains variations from plan details or specifications or significantly affects project cost, field construction or operations, discuss the submittal with and submit all copies to the Engineer. State the reason for the proposed variation in the submittal. To minimize review time, make sure all submittals are complete when initially submitted. Provide a contact name and information with each submittal. Direct any questions regarding submittal requirements to the Engineer, Structures Management Unit contacts or the Geotechnical Engineering Unit contacts noted below.

In order to facilitate in-plant inspection by NCDOT and approval of working drawings, provide the name, address and telephone number of the facility where fabrication will actually be done if different than shown on the title block of the submitted working drawings. This includes, but is not limited to, precast concrete items, prestressed concrete items and fabricated steel or aluminum items.

2.0 ADDRESSES AND CONTACTS

For submittals to the Structures Management Unit, use the following addresses:

Via US mail:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1581 Mail Service Center
Raleigh, NC 27699-1581

Attention: Mr. J. L. Bolden, P. E.

Via other delivery service:

Mr. B. C. Hanks, P. E.
State Structures Engineer
North Carolina Department
of Transportation
Structures Management Unit
1000 Birch Ridge Drive
Raleigh, NC 27610

Attention: Mr. J. L. Bolden, P. E.

Submittals may also be made via email.

Send submittals to:

jlbolden@ncdot.gov (James Bolden)

Send an additional e-copy of the submittal to the following address:

eomile@ncdot.gov (Emmanuel Omile)

mrorie@ncdot.gov (Madonna Rorie)

For submittals to the Geotechnical Engineering Unit, use the following addresses:

For projects in Divisions 1-7, use the following Eastern Regional Office address:

Via US mail:

Mr. Chris Kreider, P. E.

Via other delivery service:

Mr. Chris Kreider, P. E.

Project R-2530B

ST-17

Stanly County
Montgomery County

Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
1570 Mail Service Center
Raleigh, NC 27699-1570

Eastern Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Eastern Regional Office
3301 Jones Sausage Road, Suite 100
Garner, NC 27529

Via Email: EastGeotechnicalSubmittal@ncdot.gov

For projects in Divisions 8-14, use the following Western Regional Office address:

Via US mail or other delivery service:

Mr. Eric Williams, P. E.
Western Regional Geotechnical
Manager
North Carolina Department
of Transportation
Geotechnical Engineering Unit
Western Regional Office
5253 Z Max Boulevard
Harrisburg, NC 28075

Via Email: WestGeotechnicalSubmittal@ncdot.gov

The status of the review of structure-related submittals sent to the Structures Management Unit can be viewed from the Unit's website, via the "Drawing Submittal Status" link.

The status of the review of geotechnical-related submittals sent to the Geotechnical Engineering Unit can be viewed from the Unit's website, via the "Geotechnical Construction Submittals" link.

Direct any questions concerning submittal review status, review comments or drawing markups to the following contacts:

Primary Structures Contact: James Bolden (919) 707 – 6408
(919) 250 – 4082 facsimile

jlbolden@ncdot.gov

Secondary Structures Contacts: Emmanuel Omile (919) 707 – 6451
Madonna Rorie (919) 707 – 6508

Eastern Regional Geotechnical Contact (Divisions 1-7):

Chris Kreider (919) 662 – 4710
ckreider@ncdot.gov

Project R-2530B

ST-18Stanly County
Montgomery County

Western Regional Geotechnical Contact (Divisions 8-14):

Eric Williams (704) 455 – 8902

ewilliams3@ncdot.gov**3.0 SUBMITTAL COPIES**

Furnish one complete copy of each submittal, including all attachments, to the Engineer. At the same time, submit the number of hard copies shown below of the same complete submittal directly to the Structures Management Unit and/or the Geotechnical Engineering Unit.

The first table below covers “Structure Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Structures Management Unit. The second table in this section covers “Geotechnical Submittals”. The Engineer will receive review comments and drawing markups for these submittals from the Geotechnical Engineering Unit.

Unless otherwise required, submit one set of supporting calculations to either the Structures Management Unit or the Geotechnical Engineering Unit unless both units require submittal copies in which case submit a set of supporting calculations to each unit. Provide additional copies of any submittal as directed.

STRUCTURE SUBMITTALS

Submittal	Copies Required by Structures Management Unit	Copies Required by Geotechnical Engineering Unit	Contract Reference Requiring Submittal ¹
Arch Culvert Falsework	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Box Culvert Falsework ⁷	5	0	Plan Note, SN Sheet & “Falsework and Formwork”
Cofferdams	6	2	Article 410-4
Foam Joint Seals ⁶	9	0	“Foam Joint Seals”
Expansion Joint Seals (hold down plate type with base angle)	9	0	“Expansion Joint Seals”

Project R-2530B

ST-19Stanly County
Montgomery County

Expansion Joint Seals (modular)	2, then 9	0	“Modular Expansion Joint Seals”
Expansion Joint Seals (strip seals)	9	0	“Strip Seals”
Falsework & Forms ² (substructure)	8	0	Article 420-3 & “Falsework and Formwork”
Falsework & Forms (superstructure)	8	0	Article 420-3 & “Falsework and Formwork”
Girder Erection over Railroad	5	0	Railroad Provisions
Maintenance and Protection of Traffic Beneath Proposed Structure	8	0	“Maintenance and Protection of Traffic Beneath Proposed Structure at Station ____”
Metal Bridge Railing	8	0	Plan Note
Metal Stay-in-Place Forms	8	0	Article 420-3
Metalwork for Elastomeric Bearings ^{4,5}	7	0	Article 1072-8
Miscellaneous Metalwork ^{4,5}	7	0	Article 1072-8
Disc Bearings ⁴	8	0	“Disc Bearings”
Overhead and Digital Message Signs (DMS) (metalwork and foundations)	13	0	Applicable Provisions
Placement of Equipment on Structures (cranes, etc.)	7	0	Article 420-20
Precast Concrete Box Culverts	2, then 1 reproducible	0	“Optional Precast Reinforced Concrete Box Culvert at Station ____”
Prestressed Concrete Cored Slab (detensioning sequences) ³	6	0	Article 1078-11
Prestressed Concrete Deck Panels	6 and 1 reproducible	0	Article 420-3

Project R-2530B

ST-20Stanly County
Montgomery County

Prestressed Concrete Girder (strand elongation and detensioning sequences)	6	0	Articles 1078-8 and 1078-11
Removal of Existing Structure over Railroad	5	0	Railroad Provisions
Revised Bridge Deck Plans (adaptation to prestressed deck panels)	2, then 1 reproducible	0	Article 420-3
Revised Bridge Deck Plans (adaptation to modular expansion joint seals)	2, then 1 reproducible	0	“Modular Expansion Joint Seals”
Sound Barrier Wall (precast items)	10	0	Article 1077-2 & “Sound Barrier Wall”
Sound Barrier Wall Steel Fabrication Plans ⁵	7	0	Article 1072-8 & “Sound Barrier Wall”
Structural Steel ⁴	2, then 7	0	Article 1072-8 Article 400-3 & “Construction,
Temporary Detour Structures	10	2	Maintenance and Removal of Temporary Structure at Station _____”
TFE Expansion Bearings ⁴	8	0	Article 1072-8

FOOTNOTES

1. References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Articles refer to the *Standard Specifications*.
2. Submittals for these items are necessary only when required by a note on plans.
3. Submittals for these items may not be required. A list of pre-approved sequences is available from the producer or the Materials & Tests Unit.
4. The fabricator may submit these items directly to the Structures Management Unit.
5. The two sets of preliminary submittals required by Article 1072-8 of the *Standard Specifications* are not required for these items.
6. Submittals for Fabrication Drawings are not required. Submittals for Catalogue Cuts of Proposed Material are required. See Section 5.A of the referenced provision.
7. Submittals are necessary only when the top slab thickness is 18” or greater.

Project R-2530B

ST-21Stanly County
Montgomery County**GEOTECHNICAL SUBMITTALS**

Submittal	Copies Required by Geotechnical Engineering Unit	Copies Required by Structures Management Unit	Contract Reference Requiring Submittal ¹
Drilled Pier Construction Plans ²	1	0	Subarticle 411-3(A)
Crosshole Sonic Logging (CSL) Reports ²	1	0	Subarticle 411-5(A)(2)
Pile Driving Equipment Data Forms ^{2,3}	1	0	Subarticle 450-3(D)(2)
Pile Driving Analyzer (PDA) Reports ²	1	0	Subarticle 450-3(F)(3)
Retaining Walls ⁴	1 drawings, 1 calculations	2 drawings	Applicable Provisions
Temporary Shoring ⁴	1 drawings, 1 calculations	2 drawings	“Temporary Shoring” & “Temporary Soil Nail Walls”

FOOTNOTES

- References are provided to help locate the part of the contract where the submittals are required. References in quotes refer to the provision by that name. Subarticles refer to the *Standard Specifications*.
- Submit one hard copy of submittal to the Engineer. Submit a second copy of submittal electronically (PDF via email), US mail or other delivery service to the appropriate Geotechnical Engineering Unit regional office. Electronic submission is preferred.
- The Pile Driving Equipment Data Form is available from:
https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
See second page of form for submittal instructions.
- Electronic copy of submittal is required. See referenced provision.

CRANE SAFETY**(6-20-19)**

Comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors, sub-contractors, and fully operated rental companies shall comply with the current Occupational Safety and Health Administration (OSHA) regulations.

Project R-2530B

ST-22Stanly County
Montgomery County

Submit all items listed below to the Engineer prior to beginning crane operations. Changes in personnel or equipment must be reported to the Engineer and all applicable items listed below must be updated and submitted prior to continuing with crane operations.

CRANE SAFETY SUBMITTAL LIST

- A. **Competent Person:** Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.
- B. **Riggers:** Provide the qualifications and experience of the persons responsible for rigging operations. Qualifications and experience should include, but not be limited to, weight calculations, center of gravity determinations, selection and inspection of sling and rigging equipment, and safe rigging practices.
- C. **Crane Inspections:** Inspection records for all cranes shall be current and readily accessible for review upon request.
- D. **Certifications:** Crane operators shall be certified by the National Commission for the Certification of Crane Operators (NCCCO) or the National Center for Construction Education and Research (NCCER). Other approved nationally accredited programs will be considered upon request. In addition, crane operators shall have a current CDL medical card. Submit a list of crane operator(s) and include current certification for each type of crane operated (small hydraulic, large hydraulic, small lattice, large lattice) and medical evaluations for each operator.

GROUT FOR STRUCTURES**(12-1-17)****1.0 DESCRIPTION**

This special provision addresses grout for use in pile blockouts, grout pockets, shear keys, dowel holes and recesses for structures. This provision does not apply to grout placed in post-tensioning ducts for bridge beams, girders, decks, end bent caps, or bent caps. Mix and place grout in accordance with the manufacturer’s recommendations, the applicable sections of the Standard Specifications and this provision.

2.0 MATERIAL REQUIREMENTS

Unless otherwise noted on the plans, use a Type 3 Grout in accordance with Section 1003 of the Standard Specifications.

Initial setting time shall not be less than 10 minutes when tested in accordance with ASTM C266.

Construction loading and traffic loading shall not be allowed until the 3 day compressive strength is achieved.

Project R-2530B

ST-23

Stanly County
Montgomery County

3.0 SAMPLING AND PLACEMENT

Place and maintain components in final position until grout placement is complete and accepted. Concrete surfaces to receive grout shall be free of defective concrete, laitance, oil, grease and other foreign matter. Saturate concrete surfaces with clean water and remove excess water prior to placing grout.

4.0 BASIS OF PAYMENT

No separate payment will be made for "Grout for Structures". The cost of the material, equipment, labor, placement, and any incidentals necessary to complete the work shall be considered incidental to the structure item requiring grout.

PROJECT SPECIAL PROVISION

(10-18-95) (Rev. 3-21-17))

Z-1a

PERMITS

The Contractor's attention is directed to the following permits, which have been issued to the Department of Transportation by the authority granting the permit.

<u>PERMIT</u>	<u>AUTHORITY GRANTING THE PERMIT</u>
Dredge and Fill and/or Work in Navigable Waters (404)	U. S. Army Corps of Engineers
Water Quality (401)	Division of Environmental Management, DEQ State of North Carolina

The Contractor shall comply with all applicable permit conditions during construction of this project. Those conditions marked by * are the responsibility of the Department and the Contractor has no responsibility in accomplishing those conditions.

Agents of the permitting authority will periodically inspect the project for adherence to the permits.

The Contractor's attention is also directed to Articles 107-10 and 107-13 of the *2018 Standard Specifications* and the following:

Should the Contractor propose to utilize construction methods (such as temporary structures or fill in waters and/or wetlands for haul roads, work platforms, cofferdams, etc.) not specifically identified in the permit (individual, general, or nationwide) authorizing the project it shall be the Contractor's responsibility to coordinate with the Engineer to determine what, if any, additional permit action is required. The Contractor shall also be responsible for initiating the request for the authorization of such construction method by the permitting agency. The request shall be submitted through the Engineer. The Contractor shall not utilize the construction method until it is approved by the permitting agency. The request normally takes approximately 60 days to process; however, no extensions of time or additional compensation will be granted for delays resulting from the Contractor's request for approval of construction methods not specifically identified in the permit.

Where construction moratoriums are contained in a permit condition which restricts the Contractor's activities to certain times of the year, those moratoriums will apply only to the portions of the work taking place in the restricted waters, wetlands or buffer zones, provided that activities outside those areas is done in such a manner as to not affect the restricted waters, wetlands or buffer zones.

P-2
U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2008-02315 County: Montgomery U.S.G.S. Quad: NC-Morrow Mountain

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: North Carolina Department of Transportation (NCDOT)

Address: Carla Dagnino
1020 Birch Ridge Drive
Raleigh, NC 27610

Telephone Number: 919-707-6126

E-mail: jhemphill@ncdot.gov

Size (Corridor Length) ~14.6 miles

Nearest Waterway Pee Dee River

USGS HUC 03040104

Nearest Town Mount Gilead

River Basin Upper Pee Dee

Coordinates Latitude: 35.30960

Longitude: -80.07704

Location description: The project area consists of an approximately 14.6 mile corridor that spans along NC 24-27 from NC 740 in the City of Albemarle in Stanly County, NC to the proposed Troy Bypass (NCDOT Transportation Improvement Program (TIP) project R-623) which is located west of the Town of Troy in Montgomery, NC.

Description of projects area and activity: The project is a combination of three separate NCDOT projects: TIP projects R-2530B, B-4974 and R-2527. TIP projects R-2530B and B-4974 have final impact totals that are based off of final design plans; whereas, TIP project R-2527 is only in the preliminary design phase with 25 percent review plans.

TIP project R-2530B will widen the existing NC 24-27, from west of NC 740 to the Pee Dee River in Stanly County, from a two to three-lane facility to a four-lane divided facility. TIP project R-2530B will also involve a superstreet design in the areas where curb and gutter is proposed. TIP project B-4974 will rehabilitate the existing Bridge No. 51 over the Pee Dee River on the Stanly / Montgomery County line. In general, this verification would authorize the following:

- the permanent discharge of fill material into 1.01 acre wetlands;
- the permanent discharge of fill material into 0.75 acre of open waters;
- the permanent discharge of fill material into 4,980 linear feet of stream;
- the permanent discharge of fill material into 695 linear feet of streams for bank stabilization causing a permanent impact to the streams but not a permanent loss of waters; and
- the temporary discharge of fill material into 611 linear feet of streams.

TIP project R-2527 will widen the existing NC 24-27 from a two-lane facility to a four-lane divided facility from east of the Pee Dee River to the Troy Bypass. Note that TIP project R-2527 is only in preliminary design with 25 percent review plans. The preliminary impact totals to streams, wetlands and open waters are estimated by using the project's slope stakes plus an additional 25 feet. According to the 25 percent review plans for TIP project R-2527, the preliminary impacts are as follows:

- impacts to 1.04 acre of wetlands,
- impacts to 8068 linear feet of streams, and
- impacts to 0.45 acre of open water.

This verification authorizes the impacts to streams, wetlands and open waters that would result from TIP projects R-2530B, B-4974 and R-2527. However, please refer to the attached Special Condition e. with regards to construction timing.

Applicable Law(s): ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: **RGP198200031 NC DOT Bridges Widening Projects, Interchange Improvements**

SEE ATTACHED NWP GENERAL, REGIONAL, AND/OR SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the enclosed

P-3

Conditions, your application signed and dated 10/16/2018, and the plans attached to this verification (1. Wetland and Surface Water Impacts Permit drawings TIP Project: R-2530B (Impact Tables include impacts associated with B-4974) dated 10/15/2018; 2. NEU Permit Plans for TIP Project: R-2530B/B-4974B Sheets Nos. UE-6 and UE-7 dated 9/28/2018; and 3. Preliminary Wetland and Surface Water Impacts Permit drawings 25% Review Plans for TIP project: R-2527). Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management **Morehead City, NC, at (252) 808-2808**.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Roscoe L. Sullivan, III** at **919-554-4884 ext. 25** or **roscoe.l.sullivan@usace.army.mil**.



Corps Regulatory Official: _____ Date: **5/2/2019**
Expiration Date of Verification: **4/30/2020**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

SPECIAL CONDITIONS

- a. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.
- b. NCDOT shall abide by all stipulations identified in the Memorandum of Agreement between the Permittee, the North Carolina State Historic Preservation Officer, the Federal Highway Administration, the United States Forest Service, and the Catawba Indian Nation, signed by the North Carolina State Historic Preservation Officer on 12/19/2018, copy attached and identified as Attachment 1.
- c. This Department of the Army permit does not authorize you to take an endangered species, in particular the Schweinitz's sunflower, *Helianthus schweinitzii*. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a BO under ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed U.S. Fish and Wildlife Service Biological Opinion (BO) (Attachment 2) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your permit. The U.S. Fish and Wildlife Service is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.
- d. The U.S. Fish and Wildlife Service's (USFWS's) Programmatic Biological Opinion (BO) titled "Northern Long-eared Bat (NLEB) Programmatic Biological Opinion for North Carolina Department of Transportation (NCDOT) Activities in Eastern North Carolina (Divisions 1-8)," dated March 25, 2015, and adopted on April 10, 2015, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that are specified in the BO. Your authorization under this Department of the Army permit is conditional upon your compliance with all the mandatory terms and conditions associated with incidental take of the BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Department of the Army permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.
- e. This permit only authorizes work on Sections TIP R-2530B and B-4974. Construction on Sections of TIP R-2527 shall not commence until: (a) final design has been completed for those sections and submitted to the U.S. Army Corps of Engineers (Corps); (b) the Permittee has minimized impacts to waters and wetlands to the maximum extent practicable and the Corps concurs with this assessment through standard Merger 4B and 4C meetings; (c) any modification to the plans have been approved by the Corps in writing; and (d) a final compensatory mitigation plan has been submitted by the Permittee and approved by the Corps.
- f. **Work Limits:** All work authorized by this permit shall be performed in strict compliance with the attached permit plans, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the US Army Corps of Engineers prior to any active construction in waters or wetlands.

SAW-2008-02315

g. **Permit Distribution:** The Permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, drawings and attachments shall be available at the project site during the construction and maintenance of this project.

h. **Pre-Construction Meeting:** The Permittee shall schedule and attend a preconstruction meeting between its Construction representatives, the contractors representatives, and the U.S. Army Corps of Engineers, Raleigh Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all the terms and conditions contained with this Department of Army Permit. The Permittee shall provide the Corps, Raleigh Regulatory Field Office, NCDOT Project Manager, with a copy of the final permit plans at least two weeks prior to the preconstruction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps, NCDCM, and NCDWR Project Managers can attend. The Permittee shall invite the Corps, NCDCM, and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

i. **Notification of Construction Commencement and Completion:** The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

j. **Reporting Address:** All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, Wilmington District Raleigh Regulatory Field Office, Attn: Ross Sullivan, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587, or roscoe.l.sullivan@usace.army.mil. The Permittee shall reference the following permit number, SAW-2008-02315, on all submittals.

k. **Reporting Violations:** Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 919-554-4884 within 24 hours of the Permittee's discovery of the violation.

l. **Clean Fill:** The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, construction debris, metal and plastic products, and concrete block with exposed reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

m. Culverts:

1) Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

2) Measures shall be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or

SAW-2008-02315

culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

3) The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

4) Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

n. Sediment and Erosion Control:

1) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

2) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

3) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

4) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the "North Carolina Sediment and Erosion Control Planning and Design Manual" to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to ensure compliance with the appropriate turbidity water quality standards. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project shall remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A, Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

o. Borrow and Waste: To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require

SAW-2008-02315

its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. The Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. The Permittee shall submit to the Corps site-specific information needed to ensure that borrow and/or waste sites comply with all applicable Federal requirements, to include compliance with the Endangered Species Act and the National Historic Preservation Act, such as surveys or correspondence with agencies (e.g., the USFWS, the NC-HPO, etc.). The required information shall also include the location of all aquatic features, if any, out to a distance of 400 feet beyond the nearest boundary of the site. The Permittee shall not approve any borrow and/or waste sites before receiving written confirmation from the Corps that the proposed site meets all Federal requirements, whether or not waters of the U.S., including wetlands, are located in the proposed borrow and/or waste site. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee shall ensure that all borrow and/or waste sites comply with Special Condition p. of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. This documentation will include data regarding soils, vegetation, hydrology, any delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition p. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work.

p. Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

Action ID Number: SAW-2008-02315 County: Montgomery

Permittee: North Carolina Department of Transportation, Carla Dagnino

Project Name: R-2530B, B-4974, R-2527: NC 24/27 Widening from Albemarle to the Troy Bypass

Date Verification Issued: 5/2/2019

Project Manager: Roscoe L. Sullivan, III

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Roscoe L. Sullivan, III
Raleigh Regulatory Office
U.S Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
or
roscoe.l.sullivan@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343
April 30, 2015

Regional General Permit No. 198200031

Name of Permittee: North Carolina Department of Transportation

Effective Date: April 30, 2015

Expiration Date: April 30, 2020

**DEPARTMENT OF THE ARMY
REGIONAL GENERAL PERMIT**

A regional general permit (RGP) to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby modified and re-issued by authority of the Secretary of the Army by the

District Commander
U.S. Army Engineer District, Wilmington
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

TO AUTHORIZE THE DISCHARGE OF DREDGED OR FILL MATERIAL IN WATERS OF THE UNITED STATES (U.S.), INCLUDING WETLANDS, ASSOCIATED WITH MAINTENANCE, REPAIR, AND CONSTRUCTION PROJECTS CONDUCTED BY THE VARIOUS DIVISIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) INCLUDING THE NCDOT DIVISION OF HIGHWAYS, RAIL, BICYCLE/PEDESTRIAN, ECT.

Activities authorized are:

a. Construction, maintenance, and repair of bridges, to include work on the approaches, where permanent impacts resulting in a loss of waters of the U.S. will be less than or equal to 500 linear feet (lf) of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

b. Best-fit widening projects that have undergone interagency review and completed the current interagency Merger Process, which merges the requirements of the National Environmental Policy Act (NEPA) with those found within Section 404 of the Clean Water Act (CWA).

While there is no impact threshold for these widening projects, the Corps has the discretion to require an individual permit if it determines that the proposed impacts will have more than a minimal impact on the aquatic environment or on other environmental factors, or if the project would normally require an Environmental Impact Statement (EIS) under current Federal Highway Administration (FHWA) guidelines. Best-fit projects may include a small amount of new location roadway for components such as interchanges or intersections, provided the new location portion has been concurred upon by the merger team.

c. Minor widening projects, such as paving and/or widening secondary roads, or interchange improvements, when permanent impacts which result in a loss of waters of the U.S. from installation and/or extension of culverts and/or pipes will be less than or equal to 500 lf of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

d. Stream relocation(s) associated with projects identified in a-c above. Stream relocation lengths are to be evaluated independently and are not included within each respective maximum limit threshold for the authorized actions stated above.

***Single and complete linear project:** A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term “single and complete project” is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the U.S. (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of this RGP. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Generally, off-site detours are preferred to avoid and minimize impacts to the human and natural environment. However, if an off-site detour is considered impracticable, then an on-site detour may be considered as a necessary component of the actions described above. Impacts from the detour may be considered temporary and may not require compensatory mitigation if the impacted area is restored to its pre-project condition after construction is complete. If the construction of a detour (on-site or off-site) includes standard undercutting methods, removal of all material and backfilling with suitable material is required.

1. Special Conditions.

a. The applicant must submit a pre-construction notification (PCN) with specified attachments to the District Engineer and receive written verification from the Corps that the proposed work complies with this RGP prior to commencing any activity authorized by this RGP.

b. If the project will not impact a designated “Area of Environmental Concern” (AEC) in the twenty (20) counties of North Carolina covered by the North Carolina Coastal Area Management Act (CAMA), then a consistency submission is not required. If the project will impact a designated AEC and meets the definition of “development”, then the applicant must

obtain the required CAMA permit. Development activities may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

The twenty (20) CAMA counties in North Carolina include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.

c. Discharges into Waters of the U.S. designated by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are prohibited during the period between February 1 and June 30, without prior written approval from NCDMF, NCWRC, National Marine Fisheries Service (NMFS), and the Corps. Discharges into waters of the U.S. designated by NCDMF as primary nursery areas and discharges into waters of the U.S. designated by NCWRC as primary nursery areas in inland waters shall be coordinated with NCDMF (per existing agreement with NCDMF) and NCWRC prior to being authorized by this RGP. Coordination with NCDMF and NCWRC may result in a required construction moratorium during periods of significant biological productivity or critical life stages.

The applicant should contact:

**NC Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557
Telephone 252-726-7021
or 800-682-2632**

**North Carolina Wildlife Resources Commission
Habitat Conservation Program Manager
1721 Mail Service Center
Raleigh, NC 27699-1721
Telephone (919) 733-7638**

d. This permit does not authorize the use of culverts in areas designated as anadromous fish spawning areas by the NCDMF or the NCWRC.

e. Waters of the U.S. designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from NMFS.

f. If the project is located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then all pipe and culvert inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust AEC and/or the Estuarine Waters AEC as designated by CAMA. If the project is not located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then culvert inverts will be buried at least one foot below the bed of the stream for culverts greater than 48 inches in diameter. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The potential for destabilization of the channel and head cutting upstream should be considered in the placement of the culvert. A waiver from the depth specifications in this condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition would result in more adverse impacts to the aquatic environment. Culverts placed in wetlands do not have to be buried.

g. No work shall be authorized by this RGP within the twenty coastal counties, as defined by the NCDCM, without prior consultation with NOAA Fisheries. For each activity reviewed by the Corps where it is determined that the activity may affect Essential Fish Habitat (EFH) for federally managed species, an EFH Assessment shall be prepared by the applicant and forwarded to the Corps and NOAA Fisheries for review and comment prior to authorization of work.

h. Discharges of dredged or fill material into waters of the U.S., including wetlands, must be minimized or avoided to the maximum extent practicable.

i. No activity may result in substantial permanent disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. It is acceptable to use rock vanes at culvert outlets to ensure, enhance, or maintain aquatic passage. Pre-formed scour holes are acceptable when designed for velocity reduction. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level. Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation, if practicable. If multiple culverts are used, the construction of floodplain benches and/or sills to maintain base flow is required, if practicable.

j. Upon completion of any work authorized by this RGP, all temporary fills (to include culverts, etc.) will be completely removed from waters of the U.S. and the areas will be restored to preconstruction conditions, to include pre-project elevations and contours, restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors. This work will be completed within 60 days of completion of project construction. If this timeframe occurs while a required moratorium of this permit is in effect, the temporary fill shall be removed in its entirety within 60 days of the moratorium end date. If vegetation cannot be planted due to the time of the year, all disturbed areas will be seeded with a native mix appropriate for the impacted area, and vegetation will be planted in the fall. A native seed mix may contain non-invasive small grain annuals (e.g. millet and rye grain) to ensure adequate cover while native vegetation becomes established. The PCN must include a restoration plan showing how all temporary fills and structures will be removed and how the area will be restored to pre-project conditions.

k. All activities authorized by this RGP shall, to the extent practicable, be conducted "in the dry", with barriers installed between work areas and aquatic habitat to protect that habitat from sediment, concrete, and other pollutants. Where concrete is utilized, measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with waters of the U.S. until the concrete has cured/hardened. All water in the work area that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

l. In cases where new alignment approaches are to be constructed and the existing approach fill in waters of the U.S. is to be abandoned and no longer maintained as a roadway, the

abandoned fill shall be removed and the area will be restored to preexisting wetland/stream conditions and elevations, to include restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors, to the extent practicable. This activity may qualify as compensatory mitigation credit for the project and will be assessed on a case-by-case basis in accordance with Special Conditions "q" and "r" below. A restoration plan detailing this activity will be required with the submittal of the PCN.

m. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

n. The project must be implemented and/or conducted so that all reasonable and practicable measures to ensure that equipment, structures, fill pads, and work associated with the project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or shoreline/streambank erosion. During construction, the permittee shall routinely monitor for these effects, cease all work if/when detected, take initial corrective measures to correct actively eroding areas, and notify the Corps immediately. Permanent corrective measures may require additional authorization from the Corps.

o. All PCNs will describe sedimentation and erosion control structures and measures proposed for placement in waters of the U.S. To the extent practicable, structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams. In addition, appropriate soil and erosion control measures must be established and maintained during construction. All fills, temporary and permanent, must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

p. Before discharging dredged or fill material into waters of the U.S. in the twenty-five (25) mountain counties of North Carolina, the applicant will submit a PCN to the NCWRC and the Corps concurrently. The PCN shall summarize alternatives to conducting work in mountain trout waters considered during the planning process, detail why alternatives were or were not selected, and contain a compensatory mitigation plan for all unavoidable adverse impacts to mountain trout waters. For proposals where a bridge is replaced with a culvert, the PCN must also include details of any on-site evaluations that were conducted to determine that installation of a culvert will not adversely affect passage of fish or other aquatic biota at the project site. This information must include factors such as the proposed slope of the culvert and determinations of how the slope will be expected to allow or impede passage, the necessity of baffles and/or sills to ensure passage, design considerations to ensure that expected baseflow will be maintained for passage and that post-construction velocities will not prevent passage, site conditions that will or will not allow proper burial of the culvert, existing structures (e.g., perched culverts, waterfalls, etc.) and/or stream patterns up and downstream of the culvert site that could affect passage and bank stability, and any other considerations regarding passage. The level of detail for this information should be based on site conditions (i.e., culverts on a slope over 3% will most likely

require more information than culverts on a slope that is less than 1%, etc.). Also, in order to evaluate potential impacts, describe bedforms that will be impacted by the proposed culvert – e.g., pools, glides, riffles, etc. The NCWRC will respond both to the proponent and directly to the Corps.

The twenty-five (25) designated trout counties of North Carolina include Alleghany, Caldwell, Watauga, Ashe, Mitchell, Wilkes, Avery, Burke, Stokes, Surry, Buncombe, Henderson, Polk, Cherokee, Jackson, Rutherford, Clay, Macon, Swain, Graham, Madison, Transylvania, Haywood, McDowell, and Yancey.

The applicant may contact NCWRC at:

North Carolina Wildlife Resources
Commission
Ms. Marla Chambers
Western NCDOT Permit Coordinator
206 Charter Street
Albemarle, NC 28001
Office: 704-982-9181

q. Compensatory mitigation will be required for permanent impacts resulting in a loss of waters of the U.S., including wetlands, from culverts/pipes and associated fill. Mitigation will also be required for stream relocation projects. The applicant will attach a proposed mitigation plan to the PCN. Mitigation proposals will be in accordance with currently approved Wilmington District and/or Corps-wide mitigation regulations and guidance. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

r. Stream relocation(s) associated with projects may be authorized under this RGP. As stated above, mitigation will be required for all relocation projects. If the stream relocation is conducted in accordance with the requirements stated below in 1-5, the relocated segment of stream may* be considered toward reducing the amount of compensatory mitigation required. A relocation plan must be submitted with the PCN that addresses all factors required within the current Wilmington District, Corps of Engineers Stream Mitigation Guidelines, which can include, but may not be limited to:

(1) The relocated stream has pattern, profile, and dimension based on natural channel design. If natural channel design construction is not possible due to site constraints, the relocated stream must have pattern, profile, and dimension similar to, or better than, the existing stream. Note that site constraints do not include those situations where NCDOT chooses not to acquire additional adjacent property that is available for purchase.

(2) The new stream meets the current buffer requirements as stated in current District stream mitigation guidance. If the required buffer widths cannot be obtained, a project-by-project decision will be completed to determine if additional compensatory mitigation is required.

(3) The new location allows the relocated stream to remain stable (e.g., in a

valley vs. on a slope, no bends that will impact stability, etc.).

(4) There is no loss of channel for any reason (e.g., old channel is 200' and new channel is 150' = 50' channel loss; part of the new channel is put in a culvert; the new channel (sides and bottom) is hardened with concrete, rip rap, etc.).

(5) The Corps will determine if monitoring and reporting will be required for a specific project and the parameters of any required monitoring and reporting. If monitoring is required, a monitoring plan must be included with the PCN and meet current requirements.

All relocation plans must clearly depict both the existing channel and the proposed (relocated) channel.

* Conducting stream relocation(s) in accordance with 1-5 above may not fully compensate for the impact and may require additional compensatory mitigation. The Corps Project Manager will determine if the proposed amount of mitigation is adequate on a project-by-project basis.

If stream relocation cannot be conducted in accordance with 1-5 above, mitigation at a 2:1 ratio will typically be required unless: (1) the applicant provides a Stream Quality Assessment Worksheet or NCSAM documentation (when available) that supports a different mitigation ratio; (2) the Corps Project Manager determines that the relocated stream, while not in full compliance with 1-5 above, warrants partial mitigation, or; (3) the Corps determines that the existing stream is an excellent quality stream, in which case a 3:1 mitigation ratio may be required. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

If the Corps determines that the proposed stream relocation is of such a magnitude that it cannot be authorized by this RGP, an Individual Permit will be required.

s. The applicant shall sign and return the compliance certificate that is attached to the RGP verification letter.

t. In the event that any Federal agency maintains an objection or any required State authorization is outstanding, no notice to proceed will be given until objections are resolved and State authorizations are issued.

u. The Corps may place additional special conditions, limitations, or restrictions on any verification of the use of RGP 31 on a project-by-project basis.

2. General Conditions.

a. Except as authorized by this RGP or any Corps approved modification to this RGP, no excavation, fill or mechanized land-clearing activities shall take place within waters or wetlands, at any time in the construction or maintenance of this project. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

b. Authorization under this RGP does not obviate the need to obtain other federal, state, or local authorizations.

c. All work authorized by this RGP must comply with the terms and conditions of the applicable CWA Section 401 Water Quality Certification for this RGP issued by the NCDWR.

d. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

e. The activities authorized by this RGP must not interfere with the public's right to free navigation on all navigable waters of the U.S. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work for a reason other than safety.

f. The permittee understands and agrees that, if future operations by the U.S. require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

g. The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the U.S. and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the affected water of the U.S. to its former conditions.

h. The permittee will allow the Wilmington District Engineer or his representative to inspect the authorized activity at any time deemed necessary to assure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

i. This RGP does not grant any property rights or exclusive privileges.

j. This permit does not authorize any injury to the property or rights of others.

k. This RGP does not authorize the interference with any existing or proposed federal project.

l. In issuing this permit, the Federal Government does not assume any liability for the following:

(1) Damages to the permitted project or uses thereof as a result of other permitted

or unpermitted activities or from natural causes.

(2) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest.

(3) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

(4) Design or construction deficiencies associated with the permitted work.

(5) Damage claims associated with any future modification, suspension, or revocation of this permit.

m. Authorization provided by this RGP may be modified, suspended or revoked in whole or in part if the Wilmington District Engineer, acting for the Secretary of the Army, determines that such action is in the best public interest. The term of this RGP shall be five (5) years unless subject to modification, suspension or revocation. Any modification, suspension or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

n. This RGP does not authorize any activity, which the District Engineer determines, after any necessary investigations, will adversely affect:

(1) Rivers named in Section 3 of the Wild and Scenic Rivers Act (15 U.S.C. 1273), those proposed for inclusion as provided by Sections 4 and 5 of the Act, and wild, scenic and recreational rivers established by state and local entities.

(2) Sites included in or determined eligible for listing in the National Registry of Natural Landmarks.

(3) NOAA designated marine sanctuaries, National Estuarine Research Reserves, and coral reefs.

(4) Submerged Aquatic Vegetation (SAV) as defined by the N.C. Division of Marine Fisheries at 15A NCAC 03I .0101(4)(i)).

o. Endangered Species.

(1) No activity is authorized under this RGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under this RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(2) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees (and when FHWA is the lead federal agency) must provide the district engineer with the appropriate documentation to demonstrate compliance with

those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the RGP activity, or whether additional ESA consultation is necessary.

(3) Non-federal permittees must submit a PCN to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect federally-listed endangered or threatened species or designated critical habitat, the PCN must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity “may affect” or will have “no effect” to listed species and designated critical habitat and will notify the non-federal applicant of the Corps’ determination within 45 days of receipt of a complete PCN notification. In cases where the non-federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activities will have “no effect” on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(4) As a result of formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) or NMFS, the district engineer may add species-specific endangered species conditions to the RGP.

(5) Authorization of an activity by a RGP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the USFWS or the NMFS, the ESA prohibits any person subject to the jurisdiction of the U.S. to take a listed species, where “take” means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take” means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(6) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

p. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

q. For proposed activities the sixteen counties listed below, applicants must provide a

copy of the PCN to the USFWS, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the USFWS and the Corps Project Manager for that specific county.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville USFWS: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon, Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Applicants may contact the appropriate USFWS office listed below or the US Army Corps of Engineers:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville USFWS Office counties: All counties west of and including Anson, Stanly, Davidson, Forsyth and Stokes Counties.

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

Raleigh USFWS Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

r. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program that prohibits any development, including fill, within a floodway that results in any increase in base flood elevations. This RGP does not authorize any activity prohibited by the National Flood Insurance Program.

s. The permittee must make every reasonable effort to perform the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife and natural environmental values.

t. All activities authorized by this RGP that involve the use of riprap material for bank stabilization, the following measures shall be applied:

(1) Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

(2) The placement of riprap shall be limited to the areas depicted on submitted work plan drawings and not be placed in a manner that prevents or impedes fish passage.

(3) The riprap material shall be clean and free from loose dirt or any pollutant

except in trace quantities that will not have an adverse environmental effect.

(4) It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

(5) The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

(6) A waiver from the specifications in this general condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition will result in greater adverse impacts to the aquatic environment.

u. The permittee must install and maintain, at his expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact the U.S. Coast Guard Marine Safety Office at (910) 772-2191.

v. The permittee must maintain any structure or work authorized by this permit in good condition and in conformance with the terms and conditions of this permit. The Permittee is not relieved of this requirement if the Permittee abandons the structure or work. Transfer in fee simple of the work authorized by this permit will automatically transfer this permit to the property's new owner, with all of the rights and responsibilities enumerated herein. The permittee must inform any subsequent owner of all activities undertaken under the authority of this permit and provide the subsequent owner with a copy of the terms and conditions of this permit.

w. At his sole discretion, any time during the processing cycle, the Wilmington District Engineer may determine that this RGP will not be applicable to a specific proposal. In such case, the procedures for processing an individual permit in accordance with 33 CFR 325 will be available.

x. The activity must comply with applicable FEMA approved state or local floodplain management requirements.

y. All fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

z. All excavated material will be disposed of in approved upland disposal areas.

aa. Historic Properties.

(1) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(2) Federal permittees (or when FHWA is the lead federal agency) should follow their own procedures for complying with the requirements of Section 106 of the NHPA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address Section 106 compliance for this RGP activity, or whether additional Section 106 consultation is necessary.

(3) Non-federal permittees must submit a PCN to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the NRHP, including previously unidentified properties. For such activities, the PCN must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), as appropriate, and the NRHP (see 33 CFR 330.4(g)). When reviewing PCNs, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the NHPA. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(4) The district engineer will notify the prospective permittee within 45 days of receipt of a complete PCN whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA Section 106 consultation is required and will occur, the district engineer will notify the non-federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(5) Prospective permittees should be aware that Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit will relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the

undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

bb. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the NRHP.

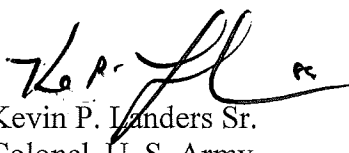
cc. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this RGP.

dd. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

ee. This RGP will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity will significantly affect the quality of the human environment and determines that an EIS must be prepared.

ff. Activities which have commenced (i.e. are under construction) or are under contract to commence in reliance upon this general permit will remain authorized provided the activity is completed within twelve months of the date of the general permit's expiration, modification, or revocation. Activities completed under the authorization of this general permit which were in effect at the time the activity was completed continue to be authorized by the general permit.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:


Kevin P. Landers Sr.
Colonel, U. S. Army
District Commander

ROY COOPER

Governor

MICHAEL S. REGAN

Secretary

LINDA CULPEPPER

Director

NORTH CAROLINA
Environmental Quality

April 3, 2019

Stanly & Montgomery Counties

NCDWR Project No. 20181416

R-2530B, B-4974, R-2527

APPROVAL of 401 WATER QUALITY CERTIFICATION with ADDITIONAL CONDITIONS-MODIFICATION

Mr. Phil Harris, III, P.E.
NCDOT Environmental Analysis Unit Manager
1598 Mail Service Center (MAIL)
Raleigh, NC 27699-1598

Dear Mr. Harris:

You have our approval, in accordance with the conditions listed below, for the following impacts for the purpose of constructing project R-2530B (widening Highway 24/27 in Stanly County), B-4974 (improving Highway 24/27 bridge over the Yadkin River) and R-2527 (widening Hwy 24/27 in Montgomery County). Project R-2527 is only in preliminary design phase and impacts are not included in this permit. This permit must be modified when R-2527 plans are finalized for that project to be constructed. Sites highlighted in yellow have received a waiver from the burial requirement due to steep slope and/or presence of bedrock. *This approval replaces the approval issued on April 2, 2019.*

Stream Impacts in the Yadkin-PeeDee River Basin

Site	Bank Stabilization (linear feet)	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
50 (Y2 sta 25+00)				109	10	119	0
51 (Y2 sta 25+00)				8	12	20	0
1 (L sta 38 + 65.5)	19		9			28	0
2 (L sta 55 + 33.69) upstream				106	7	113	0



North Carolina Department of Environment and Natural Resources | Division of Water Resources

502 North Salisbury Street | 4617 Mail Service Center | Raleigh, North Carolina 27699-1611

919.707.9000

P-24

main channel							
2 (L sta 55+33.69) upstream, side channel				65	10	75	
3 (L sta 55+33.69) downstream side	61			38	39	138	
4 (L sta 67+00)		5	7			12	0
5 (Y6 sta 12+50)				16	10	26	0
7 (L sta 93+30) upstream	26			60	10	96	0
8 (L sta 93+30) downstream	16				10	26	
9 (L sta 101+00)				127	10	137	0
11 (L sta 113+50)				62		62	0
12 (L sta 115+00) downstream				147	10	157	0
13 (L sta 116+00) upstream				23	10	33	
16 (L sta 127+00 thru sta 132+00)		368	10			378	0
17 (L sta 134+40 thru sta 145+00)		1047	35			1082	
18 (L sta 148+10) downstream				151	34	185	0
19 (L sta 149+50) upstream				44	12	56	
20 (L sta 157+00)		131	12			143	0
22 (L sta 192+00)				70	10	80	0
23 (L sta 209+00)				371	10	381	371
24 (L sta 216+50) upstream				96	12	108	305
25 (L sta 219+30) downstream				209	10	219	
26 (L sta 232+00)	20				20	40	362
27 (L sta 234+00)	10				20	30	

P-25

28 (L sta 235+40-				362	20	382	
29 (L sta 237+00)				16	10	26	0
30 (L sta 238+70)	10				16	26	0
31 (L sta 259+50)				107	10	117	0
32 (L sta 276+50) upstream				164	10	174	307
33 (L sta 278+00) downstream				143	13	156	
34 (L sta 292+00 thru 295+00)				253	25	278	0
35 (L sta 298+20)				46	10	56	
36 (L sta 304+00)	17			23		40	0
37 (L sta 306+00)	27			136	10	173	
38 (L sta 336+00)	238				18	256	0
39 (L sta 347+00)	171				20	171	0
40 (L sta 359+40)		99	11			110	0
41 (L sta 363+00) downstream				24	12	36	0
42 (L sta 363+00) upstream	44			32	7	83	
44 (L sta 371+60)		7	10			17	0
45 (L sta 375+50) downstream				86	11	97	0
46 (L sta 375+50) upstream	26			75		101	
47A (L sta 380+00)	10				16	26	0
47 (L sta 380+00)				29	10	39	
48 (L sta 382+00)				125	33	158	
TOTAL	695	1657	94	3323	517	6286	1345

Total Stream Impact for Project: 6286 linear feet.
 DWR required mitigation: 1345 linear feet
 ACOE required mitigation: 4980 linear feet

P-26

Wetland Impacts in the Yadkin-PeeDee River Basin

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Impacts Requiring Mitigation (ac)
6	0.19		0.36	0.12		0.67	0.67
10				<0.01		0.00	0.01
14	0.09			0.09		0.18	0.18
15	0.05					0.05	0.05
15	<0.01		<0.01	<0.01		0.00	0.03
19				<0.01		0.00	0.01
21	0.02				<0.01	0.02	0.02
43	0.02		<0.01			0.02	0.03
49				0.03		0.03	0.03
Total	0.37	0.00	0.38	0.27	0.01	0.97	1.03

Total Wetland Impact for Project: 1.03 acres.

Open Water Impacts in the Yadkin-PeeDee River Basin

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)	Total Fill in Open Waters (ac)
11	0.20		0.20
16	0.23		0.23
34	0.22		0.22
			0.00
TOTAL	0.65	0.00	0.65

Total Open Water Impact for Project: 0.65 acres.

The project shall be constructed in accordance with your application dated received October 18, 2018, additional information requested December 17, 2018, and subsequent requested information received on February 13, 2019 as well as requirements sent on March 11, 2019. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Number 4135. This certification corresponds to the Regional General Permit 31 issued by the Corps of Engineers. In addition, you should acquire any other federal, state or local permits before you proceed with your project including (but not limited to) Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This approval will expire with the accompanying 404 permit.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to streams (now or in the future) exceed 150 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

Condition(s) of Certification:

Project Specific Conditions

1. Fill slopes installed in wetland areas that are not complete takes will not have any part of the toe of the slope constructed in such a way that the remaining wetland is impacted, including but not limited to hydraulic impacts (draining). [15A NCAC 02H.0506(b)(2)]
2. Riprap will be the size that allows for maximum stability in, around, and discharging to jurisdictional areas. [15A NCAC 02H.0506(b)(2)]

P-27

3. Hazardous spill basins constructed in rock will be lined with an impervious liner to prevent hazardous materials from discharging through the rock and cross-contaminating the groundwater. If clay accessed on site does not produce an impervious layer on the bottom of the basin, then, bentonite clay, a material already used and approved for such liners by NC DWR, will be used. [15A NCAC 02H.0506(b)(3)]
4. Any stream reconstructed in the bottom of drained ponds may require additional impacts to establish stability. These will be determined in the field during construction as the new stream bed establishment occurs. [15A NCAC 02H.0506(b)(2)]
5. Pond draining will occur with water levels being lowered approximately one foot a day and handled through adequate sediment and erosion control measures so turbidity is not discharged downstream. [15A NCAC 02H.0506(b)(3)]
6. Temporary impacts in the mainstem of the Yadkin-PeeDee for the construction of a causeway must be completely removed at the end of construction. This should be confirmed with bottom elevations shot before installation and after removal to ensure the area's return to its original depth and conditions. [15A NCAC 02H.0506(b)(2)]
7. Weirs on hazardous spill basins must be constructed with a structural fill material that will contain a spill. [15A NCAC 02H.0506(b)(3)]
8. In accordance with commitments made in your application, clearing of vegetation for purpose of relocating utilities within jurisdictional wetlands shall be performed without the use of mechanized equipment. [15A NCAC 02H.0506(b)(3)]
9. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)]
10. Channel relocations shall be completed and stabilized, and approved on site by NCDWR staff, prior to diverting water into the new channel. Stream banks shall be matted with coir-fiber matting. Vegetation used for bank stabilization shall be limited to native riparian vegetation, and should include establishment of a vegetated buffer on both sides of the relocated channel to the maximum extent practical. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested. Once the stream has been turned into the new channel, it may be necessary to relocate stranded fish to the new channel to prevent fish kills. [15A NCAC 02H.0506(b)(3)]
11. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. NCDOT shall consult with NC Wildlife Resources staff to determine if there are any sensitive species, and the most appropriate measures to limit impacts to these species. The permittee shall observe any natural channel re-establishment, or use natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the drained pond remains stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond. [15A NCAC 02H.0506(b)(3)]
12. All bridge construction shall be performed from the existing bridge, temporary work bridges, temporary causeways, or floating or sunken barges. If work conditions require barges, they shall be floated into position and then sunk. The barges shall not be sunk and then dragged into position. Under no circumstances should barges be dragged along the bottom of the surface water. [15A NCAC 02H.0506(b)(3)]
13. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

14. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]
15. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. To meet the requirements of NCDOT's NPDES permit NCS000250, please refer to the most recent version of the *North Carolina Department of Transportation Stormwater Best Management Practices Toolbox* manual for approved measures. A waiver is granted as requested for the historical bridge being rehabilitated as part of the project. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]
16. Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited without prior written approval from the NCDWR first. [15A NCAC 02H.0506(b)(2)]
17. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly. [15A NCAC 02H .0506(b)(3)]
18. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank, or during the removal of bents from an old bridge. This condition can be waived with prior approval from the NCDWR. [15A NCAC 02H .0506(b)(3)]
19. Due to the perched pipe conditions at Permit Sites 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 23, 24, and 25, which would require the placement of the pipes on steep grade and/or bedrock, NCDWQ will not require the burial of the culverts in the streambed in these locations. However, design and placement of the culvert and other structures shall be installed in such a manner that the original stream profiles are not altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions (including pattern and profile) are to be maintained above and below locations of each culvert. The structures shall be designed and installed to allow for fish and other wildlife movement as well as prevent headcutting of the stream. The applicant may be required to provide evidence that the equilibrium has been maintained if requested in writing by the NCDWR. [15A NCAC 02H.0506(b)(2)]
20. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]
21. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage. [15A NCAC 02H.0506(b)(2)]
22. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]
23. For all linear feet of streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

24. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)]
25. The NCDOT shall design, construct, and operate and maintain hazardous spill catch basins (HSCBs) at lake and stream crossing within the WS CA watershed. The HSCBs shall be located at Station numbers L 277+75RT, 297+50RT, 307+00LT, Sta. 331+00LT, 334+00LT, 364+00LT, and 382+00RT. Two hazardous spill basins will be modified as infiltration basins but retain the ability to be isolated in case of a spill. These infiltration basins will be maintained as required with the hazardous spill basins. The locations of the infiltration basins are Station numbers 11+67 Y16 RT and 380 +07 L RT.
26. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds (15A NCAC 4B .0124). However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.
27. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to biological criteria exceedances shall not discharge stormwater directly to surface waters. Stormwater shall be treated using appropriate best management practices (e.g., vegetated conveyances, constructed wetlands, detention ponds, etc.) prior to discharging to surface waters.
- * 28. Compensatory mitigation for 1345 linear feet of impact to streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated October 16, 2019 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.
- * 29. Compensatory mitigation for impacts to 1.03 acres riverine wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Division of Mitigation Services (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. DMS has indicated in a letter dated October 16, 2019 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed July 28, 2010.

General Conditions

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]
2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]
3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

P-30

4. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]
5. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]
- *6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval, except where amended during the approval process. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]
7. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]
8. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]
9. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]
10. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]
11. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]
12. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]
13. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]
14. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]
15. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]
16. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.
17. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]
- *18. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify

the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

19. Native riparian vegetation (ex. *Salix nigra*, *Juncus* (spp), *Carex* (spp), et al.) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0231(b)(6)]
20. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.[15A NCAC 02H.0506(b)(3) and (c)(3)]
21. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:
 - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
 - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
 - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
22. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100


A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please contact Donna Hood at (704)235-2193 or donna.hood@ncdenr.gov.

Sincerely,

P-32


Linda Culpepper, Director
Division of Water Resources

Electronic copy only distribution:

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Larry Thompson, Division 10 Environmental Officer
Carla Dagnino, NC Department of Transportation
Chris Militscher, US Environmental Protection Agency
Claire Ellwanger, US Fish and Wildlife Service
Marla Chambers, NC Wildlife Resources Commission
Beth Harmon, Division of Mitigation Services
Donna Hood, NC Division of Water Resources Mooresville Regional Office
File Copy

**STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES**

WATER QUALITY GENERAL CERTIFICATION NO. 4135

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT NUMBER 14 (LINEAR TRANSPORTATION PROJECTS), AND**
- **REGIONAL GENERAL PERMIT 198200031 (NCDOT BRIDGES, WIDENING PROJECTS, INTERCHANGE IMPROVEMENTS)**

Water Quality Certification Number 4135 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (14) of the US Army Corps of Engineers regulations and Regional General Permit 198200031.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Effective date: December 1, 2017

Signed this day: December 1, 2017

By

A handwritten signature in black ink, appearing to read 'Linda Culpepper', is written over a horizontal line.

for Linda Culpepper
Interim Director

Activities meeting any one (1) of the following thresholds or circumstances require written approval for a 401 Water Quality Certification from the Division of Water Resources (DWR):

- a) If any of the conditions of this Certification (listed below) cannot be met; or
- b) Any temporary or permanent impacts to wetlands, open waters and/or streams, except for construction of a driveway to a single family residential lot that is determined to not be part of a larger common plan of development, as long as the driveway involves a travel lane of less than 25 feet and total stream impacts of less than 60 feet, including any topographic/slope stabilization or in-stream stabilization needed for the crossing; or
- c) Any stream relocation or stream restoration; or
- d) Any high-density project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
 - i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
 - ii. Has permanent wetland, stream or open water impacts; and
 - iii. Is proposing new built-upon area; and
 - iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program¹ or a state-approved local government stormwater program².

Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or

- e) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, or North Carolina or National Wild and Scenic River.
- f) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as Trout except for driveway projects that are below threshold (b) above provided that:
 - i. The impacts are not adjacent to any existing structures
 - ii. All conditions of this General Certification can be met, including adherence to any moratoriums as stated in Condition #10; and
 - iii. A *Notification of Work in Trout Watersheds Form* is submitted to the Division at least 60 days prior to commencement of work; or
- g) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
- h) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or

¹ e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES

² e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

P-35
GC4135

- * i) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless*:
 - i. The activities are listed as “EXEMPT” from these rules; or
 - ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or
 - iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

- * 1. If this Water Quality Certification is used to access residential, commercial or industrial building sites, then all parcels owned by the applicant that are part of the single and complete project authorized by this Certification must be buildable without additional impacts to streams or wetlands. If required in writing by DWR, the applicant shall provide evidence that the parcels are buildable without requiring additional impacts to wetlands, waters, or state regulated riparian buffers. [15A NCAC 02H .0506(b)(4) and (c)(4)]
- 2. For road and driveway construction purposes, this Certification shall only be utilized from natural high ground to natural high ground. [15A NCAC 02H .0506(b)(2) and (c)(2)]
- * 3. Deed notifications or similar mechanisms shall be placed on all lots with retained jurisdictional wetlands, waters, and state regulated riparian buffers within the project boundaries in order to assure compliance with NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), and/or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200). These mechanisms shall be put in place at the time of recording of the property or individual parcels, whichever is appropriate. [15A NCAC 02H .0506(b)(4) and (c)(4)]
- 4. For the North Carolina Department of Transportation, compliance with the NCDOT’s individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density projects that trigger threshold item (d) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

P-36
GC4135

- a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.
- b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

- * 1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]
2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

- * 3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

P-37
GC4135

Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.
5. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0200]

Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]
7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

P-38
GC4135

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. [15A NCAC 02H .0506(b)(5) and (c)(5)]

The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the *NC Sediment and Erosion Control Manual*, or the *NC DOT Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]
10. If activities must occur during periods of high biological activity (e.g. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification, including supporting documentation such as, a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]
14. If concrete is used during construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. [15A NCAC 02B .0200]
15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]
16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]
17. Any rip-rap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be placed such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]
18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. [15A NCAC 02H .0506(b)(2)]
19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

P-41
GC4135

20. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]
21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506(b)(3) and (c)(3)]
22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.
- * 23. If an environmental document is required under the State Environmental Policy Act (SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]
24. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.
25. The applicant and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If DWR determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]
26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

P-42
GC4135

- * 27. When written authorization is required for use of this Certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return a certificate of completion (available on the DWR website <https://edocs.deq.nc.gov/Forms/Certificate-of-Completion>). [15A NCAC 02H .0502(f)]
- 28. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards. [15A NCAC 02H .0507(c)]
- 29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

- * 1. In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).
- 2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Certification to possess any prescriptive or other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded.
- 3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]
- 4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification. This General Certification is rescinded when the US Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

P-43
GC4135

5. Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.
- * 6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the water or downstream waters are precluded.

History Note: Water Quality Certification (WQC) Number 4135 issued December 1, 2017 replaces WQC Number 4088 issued March 3, 2017; WQC 3886 issued March 12, 2012; WQC Number 3820 issued April 6, 2010; WQC Number 3627 issued March 2007; WQC Number 3404 issued March 2003; WQC Number 3375 issued March 18, 2002; WQC Number 3289 issued June 1, 2000; WQC Number 3103 issued February 11, 1997; WQC Number 2732 issued May 1, 1992; WQC Number 2666 issued January 21, 1992; WQC Number 2177 issued November 5, 1987.

STANLY & MONTGOMERY COUNTIES

LOCATION: NC 24-27 FROM NC 740 IN ALBEMARLE TO EAST OF THE PEE DEE RIVER

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS, AND CULVERTS



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF ALBEMARLE

DESIGN	EXCEPTIONS REQUIRED FOR MINIMUM	HORIZONTAL CURVE RADIUS	VERTICAL SAG	CURVE K VALUE	AND VERTICAL STOPPING SIGHT DISTANCE
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DESIGN DATA

MAADT 2019 =	16,400
MAADT 2039 =	21,500
K =	9%
D =	55%
T =	10%*
V =	50/60 MPH

* (TTST 4% + DUAL 6%)

FUNCTIONAL

CLASSIFICATION:

URBAN/RURAL ARTERIAL

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-2530B	= 6.908 MILES
LENGTH STRUCTURE TIP PROJECT B-4974	= 0.225 MILES
TOTAL LENGTH TIP PROJECT R-2530B	= 7.133 MILES

PLANS PREPARED FOR THE NCDOT BY:	Kimley-Horn INC. 10000 W. 15th Ave., Suite 200 Boulder, CO 80501 303.440.1400 www.kimley-horn.com
BY STANDARD SPECIFICATIONS	JEFFREY W. MOORE, P.E. PROJECT ENGINEER
RIGHT OF WAY DATE:	RHODES S. HUNT, P.E. PROJECT DESIGN ENGINEER
MAY 13, 2017	
LETTING DATE:	LAURA SUTTON, P.E. NCDOT PROJECT MANAGEMENT UNIT
MARCH 19, 2019	

HYDRAULICS ENGINEER

SIGNATURE

ROADWAY DESIGN ENGINEER

P.E.

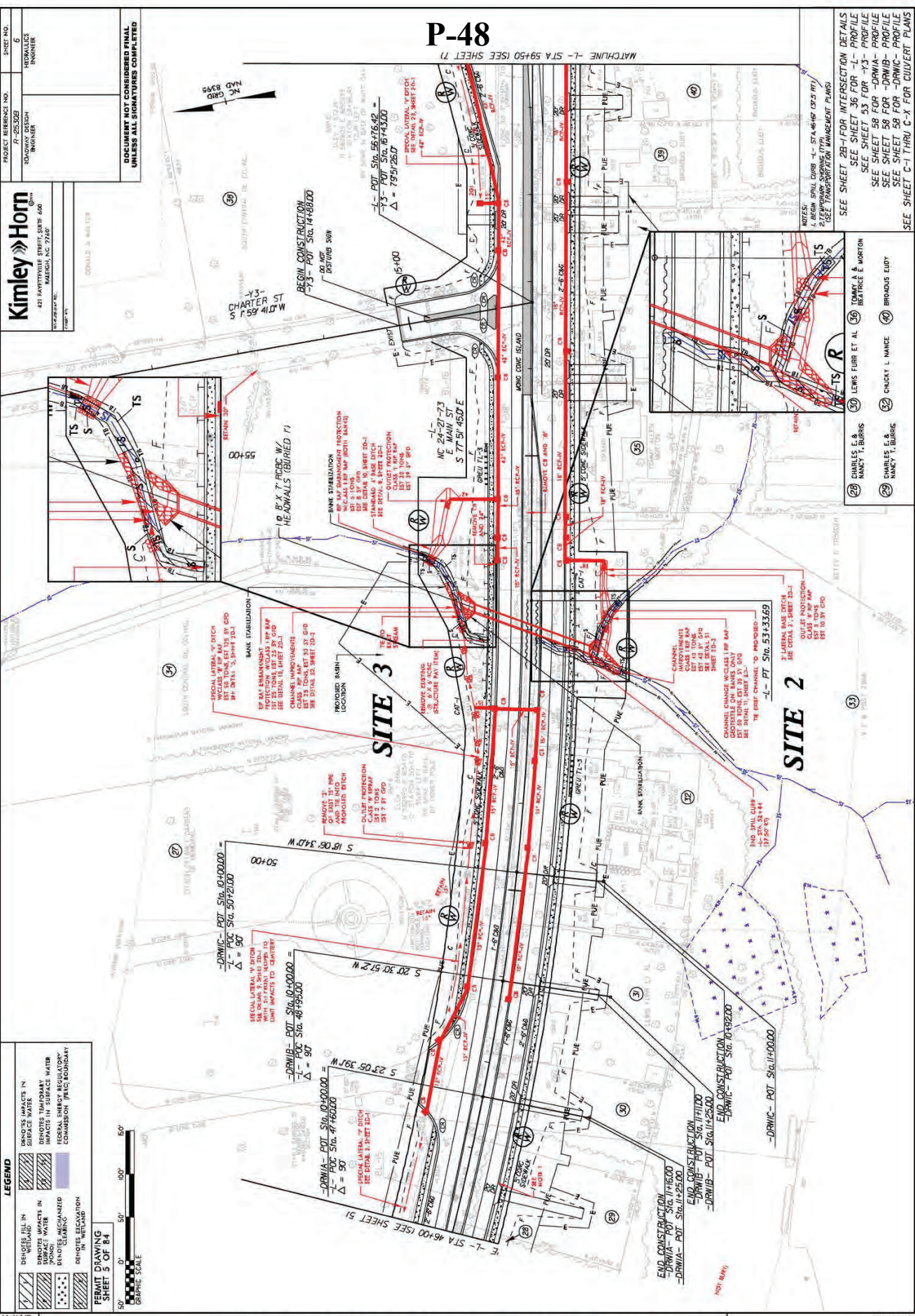


Kimley-Horn
421 FAIRVIEW STREET, SUITE 400
RICHMOND, VA 23220
TEL: 804.771.1100
WWW.KIMLEY-HORN.COM

PROJECT REFERENCE NO.	SHEET NO.
R-2530B	6
ROADWAY DESIGN	HYDRAULICS
OWNER	ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

LEGEND	
	DENOTES ALL IN WETLAND
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FEDERAL ENERGY REGULATORY COMMISSION (FERC) BOUNDARY
	DENOTES MECHANIZED CLEARING
	DENOTES EXCAVATION IN WETLAND

PERMIT DRAWING
SHEET 5 OF 84

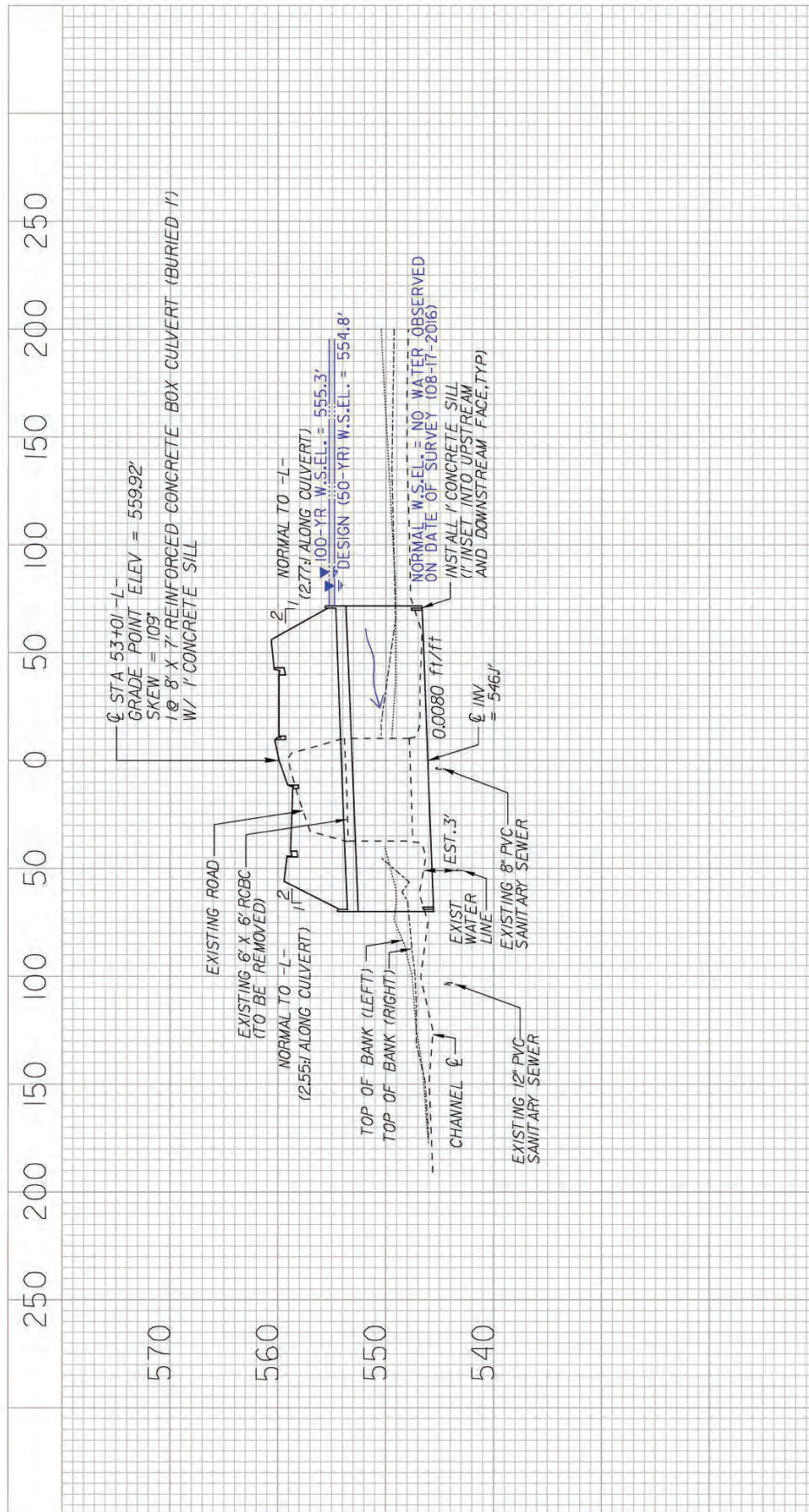


NOTES:
1. BEGIN SPILL CURB - L- STA 46+40 (SEE P-1)
2. PERMANENT SPILL CURB (SEE TRANSPORTATION MANAGEMENT PLAN)
3. SEE SHEET 2B-1 FOR INTERSECTION DETAILS
4. SEE SHEET 36 FOR -L- PROFILE
5. SEE SHEET 35 FOR -Y3- PROFILE
6. SEE SHEET 58 FOR -DRWIA- PROFILE
7. SEE SHEET 58 FOR -DRWIB- PROFILE
8. SEE SHEET 58 FOR -DRWIC- PROFILE
9. SEE SHEET C-1 THRU C-X FOR CULVERT PLANS

- 28 CHARLES E. & MARY T. BURNS
- 29 CHARLES E. & MARY T. BURNS
- 30 LEWIS FURR ET AL
- 31 TOMMY A. & MORTON
- 32 CHUCK L. MANCE
- 33 BROADUS ELOY

ROW REV - 7/20/17 - ADDED DRIVEWAY ACCESS AND TCE TO PARCELS 33, 35, 36, 37, 39, AND 40; ADJUSTED ROW AND ADJUSTED DRAINAGE STRUCTURES 0618 AND 0619 - JWM
ROW REV - 12/15/17 - ADJUSTED PUE ON PARCEL 33; ADDED DRIVEWAY ACCESS AND TCE ON PARCEL 38 - JWM
10/15/2018

SITE 2 & 3



PROJECT REFERENCE NO.

R-25303

SHEET NO.

7

ROADWAY DESIGN

ENGINEER

421 FAIRVIEW STREET, SUITE 400

RALEIGH, NC 27603

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED

DATE

10/15/2018

DESIGNED BY

CLARENCE ANDERSON

CHECKED BY

WALTER T. ILLI

APPROVED BY

SHARON T. ILLI

ROW REV - 5/018 - ADDED DRIVEWAY ACCESS (DRW2) AND ICE TO PARCEL 45, AND ADDED DRIVEWAY ACCESS (DRW2) TO PARCEL 51, UPDATED DRAINAGE DESIGN ON PARCEL 57 - JMM

REVISIONS

10/15/2018

10/15/2018

10/15/2018

NOTES:

1. DUE, PDE, DUE - CLASS "B" RFP RMP

2. SPECIAL LATERAL V. DITCH

3. SPECIAL LATERAL V. DITCH

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LEGEND

REMOVES ILL IN WELAND

REMOVES ILL IN WELAND

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REMOVES ILL IN WELAND

REMOVES ILL IN WELAND

10/15/2018

10/15/2018

EVIDENCE

(40) BROADBENT EUDY

(41) ROBERT C. &
ELIZABETH J. SAYVILLE

(42) CLARENCE ANDERSON

(43) WALTER T. &
SHARON TARTON II

(44) J. & DENNIS A. FOSTER

(45) REVOC. LIVING TRUST

NOTES:

- 1. OUTLET PROTECTION - CLASS 'B' RIP RHP
- EST. 2 TONS, EST. 7 SF GFD
- 2. SPECIAL LATERAL Y-DITCH
- SEE DETAIL SHEET 2D-1
- 3. SLOPE 12 AND 14
- 4. SLOPE 12 AND 14 Y-DITCH
- 5. SLOPE 12 AND 14
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LEGEND

	DENOTES FILL IN WETLAND
	DENOTES IMPACTS IN SURFACE WATER (POND)
	DENOTES MECHANIZED CLEARING
	DENOTES EXCAVATION IN WETLAND

NOTES IMPACTS IN
SURFACE WATER

NOTES TEMPORARY
IMPACTS IN SURFACE WATER

GENERAL ENERGY REGULATORY
COMMISSION (FERC) BOUNDARY

MIT DRAWING
SHEET 9 OF 84

15° 07' 11" E
-Y6- POT Sta. 14+24.00
0' 50' 100' 150'
GRAPHIC SCALE

18'-0" SEE SHEET

27'-0"

11'-0"

1-1 & 2B-2 FOR INTERSECTION DETAILS
SEE SHEET 36 FOR 1- PROFILE
SEE SHEET 53 FOR -Y4- PROFILE
SEE SHEET 53 FOR -Y5- PROFILE
SEE SHEET 53 FOR -Y6- PROFILE
SEE SHEET 58 FOR -DRW2- PROFILE
SEE SHEET 58 FOR -DRW2A- PROFILE



PROJECT REFERENCE NO.

R-25308

SHEET NO.

9

ROADWAY DESIGN

ENGINEER

421 FAIRVIEW STREET, SUITE 600

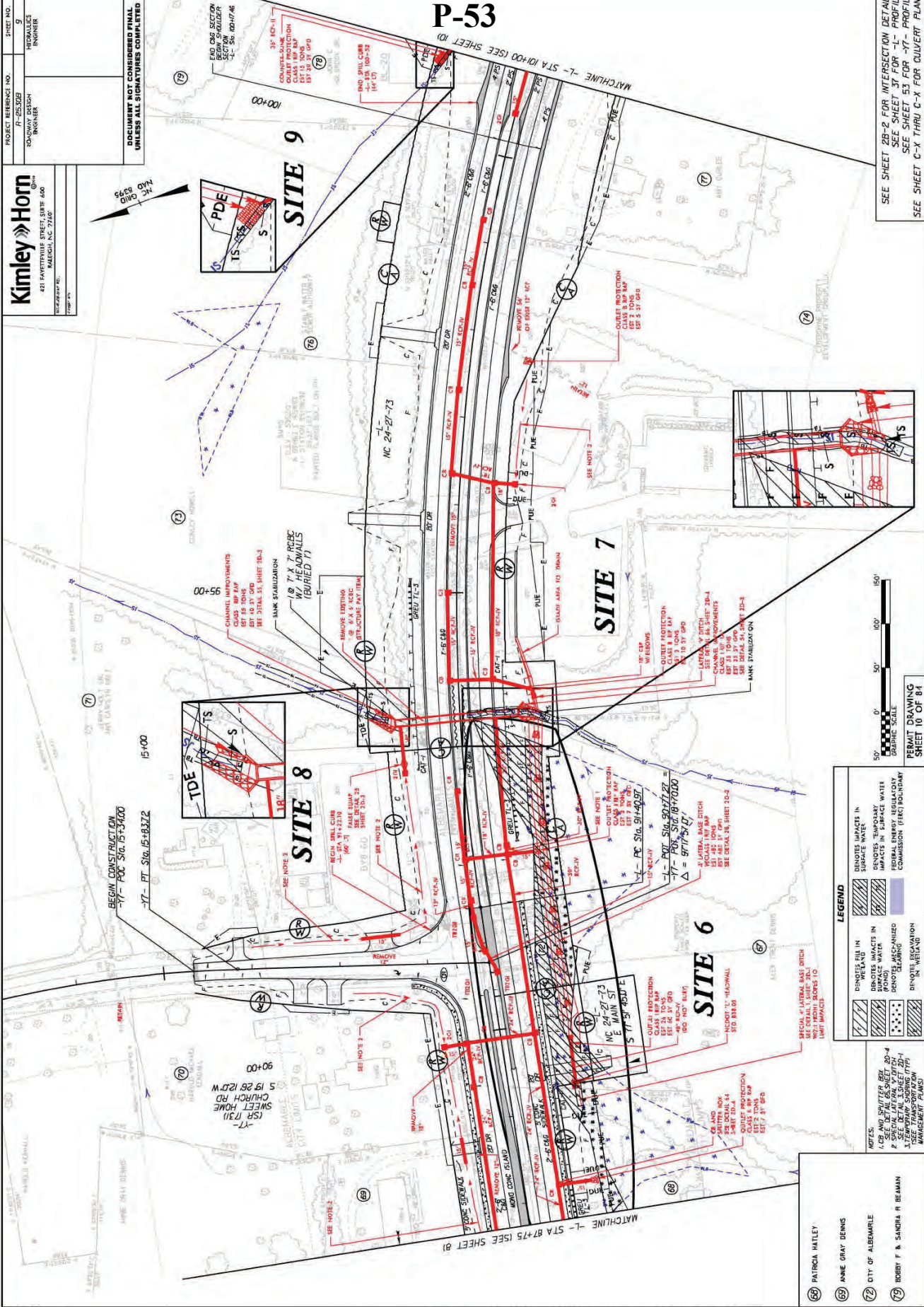
RALEIGH, NC 27601

DATE: 01/14/2014

PROJECT NO.

DOCUMENT NOT CONSIDERED FINAL

UNLESS ALL SIGNATURES COMPLETED



REVISIONS

NOV 14/14

NOV 14/14

NOV 14/14

NOV 14/14

NOV 14/14

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NOV 14/14

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PROJECT REFERENCE NO.

R-25303

SHEET NO.

9

ROADWAY DESIGN

ENGINEER

421 FAIRVIEW STREET, SUITE 600

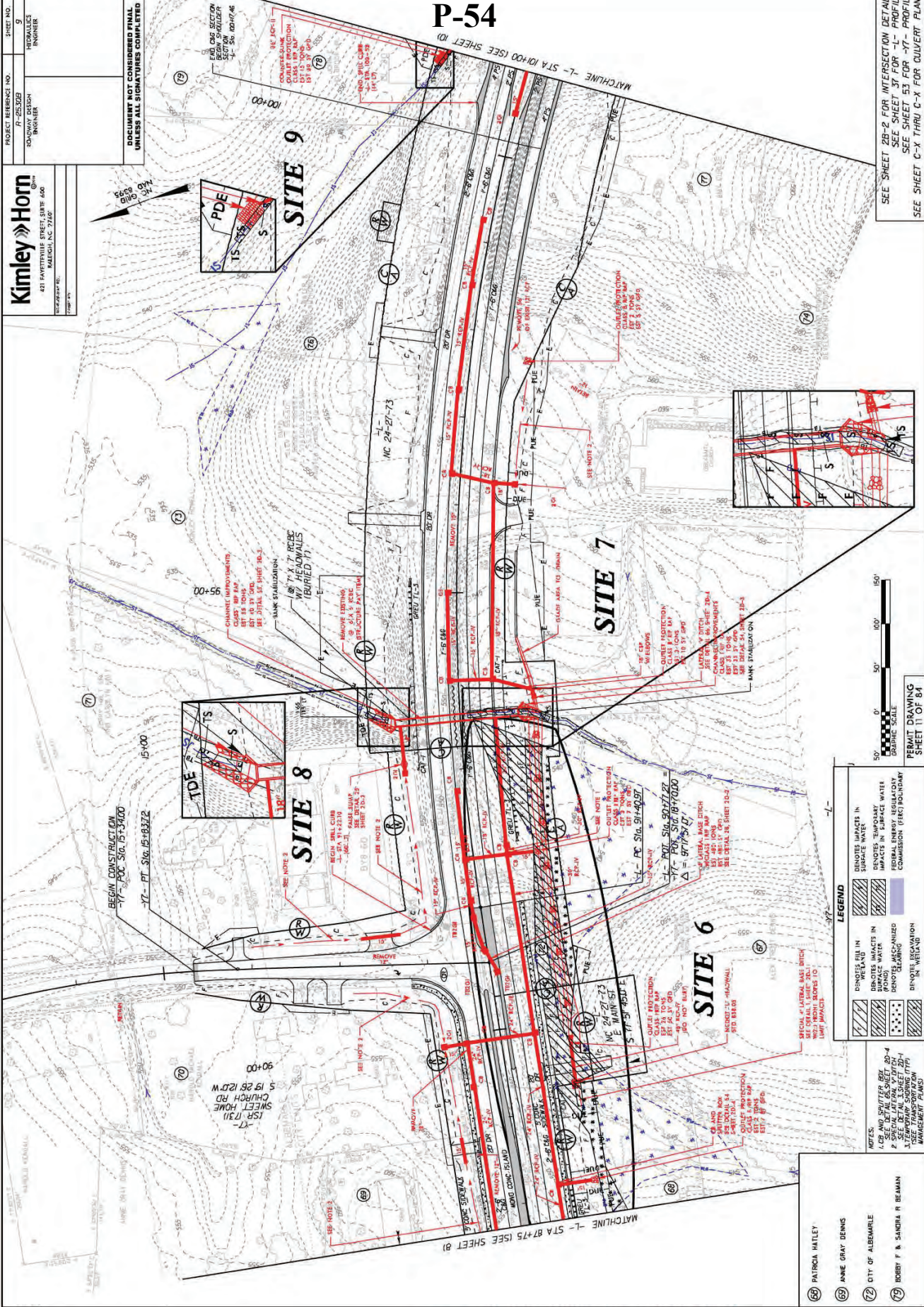
MARION, NC 27551

DATE: 01/14/2017

PROJECT: 17

DOCUMENT NOT CONSIDERED FINAL

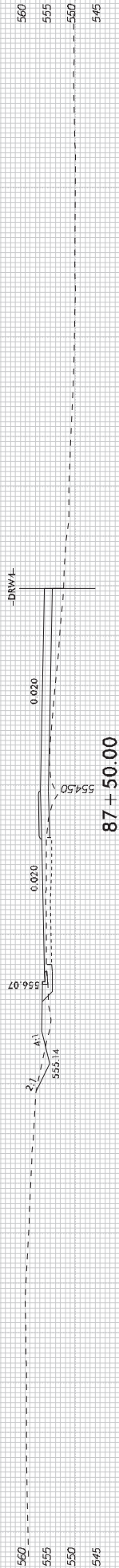
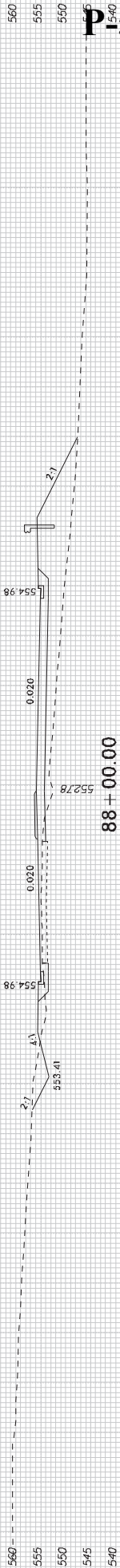
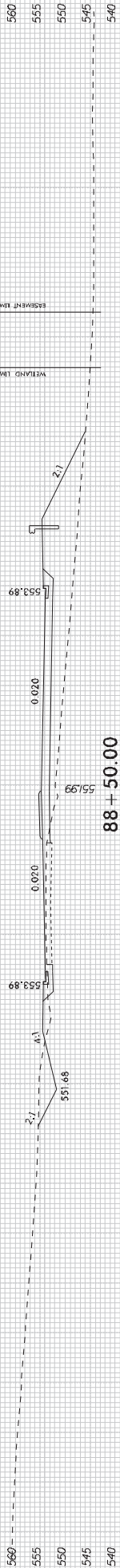
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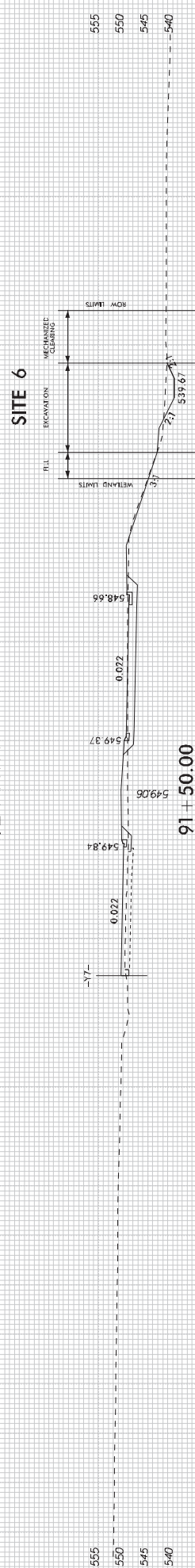
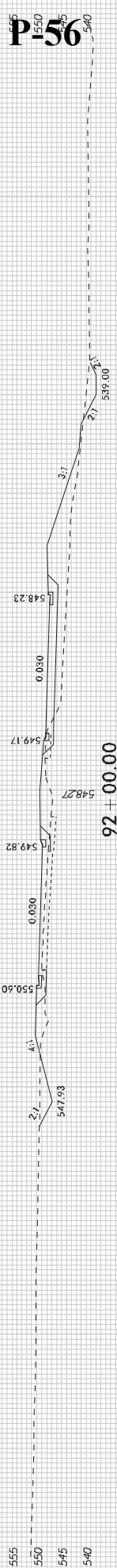
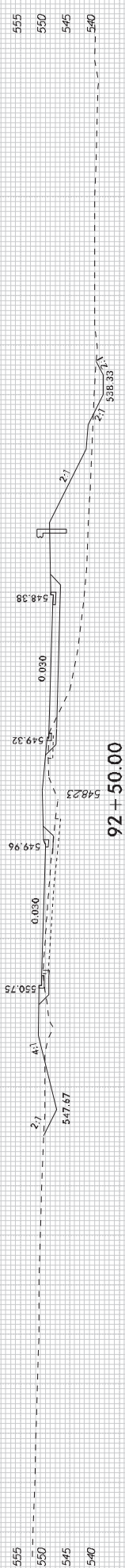
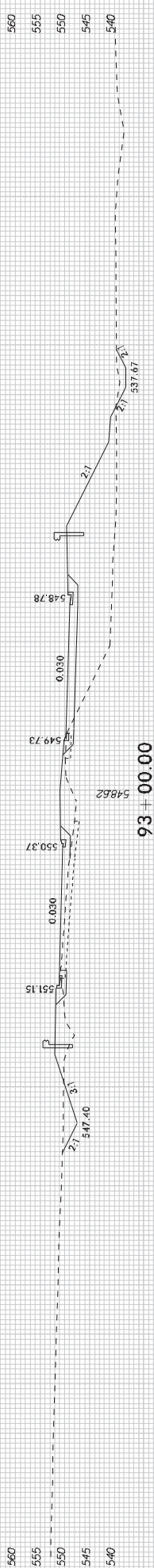
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CULVERT

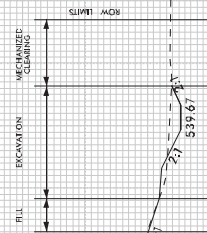
RIGHT-OF-WAY
LIMITS



-L- NC 24-27-73



SITE 6

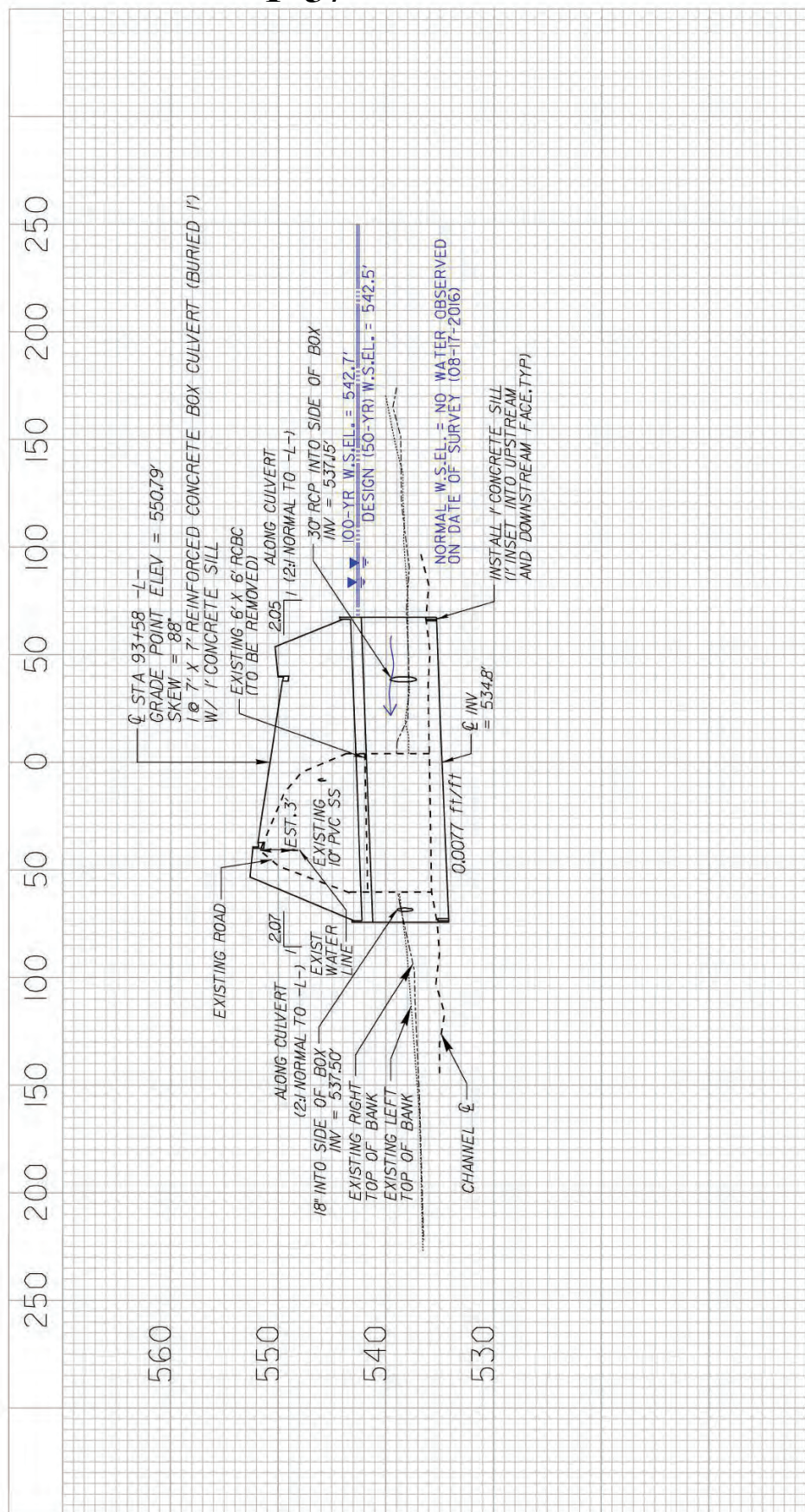


-L- NC 24-27-73

SITE 7 & 8

PERMIT DRAWING
SHEET 14 OF 84

P-57



PROJECT REFERENCE NO.

R-25308

SHEET NO.

10

DESIGNER

KIMLEY-HORN

OWNER

ROADWAY DESIGN

DATE

MARCH, NC 2140

PROJECT REFERENCE NO.

R-25308

SHEET NO.

10

PROJECT REFERENCE NO.

R-25308

SHEET NO.

10

DESIGNER

KIMLEY-HORN

OWNER

ROADWAY DESIGN

DATE

MARCH, NC 2140

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DESIGNER

KIMLEY-HORN

OWNER

ROADWAY DESIGN

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DESIGNER

KIMLEY-HORN

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ROADWAY DESIGN

DATE

MARCH, NC 2140

PROJECT REFERENCE NO.

R-25308

SHEET NO.

10

The main site plan shows two adjacent sites, SITE 9 and SITE 10, with various engineering details and annotations. SITE 9 is on the left and SITE 10 is on the right. The plan includes property lines, easements, and various engineering notes. Key features include:

- Site 9:** Includes a "PDE" (Public Display Easement) area, a "REMOVE" area, and a "PUE" (Public Utility Easement) area. It also shows a "BEGIN CONSTRUCTION" area and a "REMOVE" area.
- Site 10:** Includes a "REMOVE" area, a "PUE" area, and a "BEGIN CONSTRUCTION" area. It also shows a "REMOVE" area and a "PUE" area.
- Access Points:** Several access points are marked with "ACCESS POINT" labels and arrows indicating the direction of travel.
- Annotations:** Numerous annotations are present throughout the plan, including "REMOVE 12' AND 12' SEE DETAIL 24 SHEET 25-2", "REMOVE 12' AND 12' SEE DETAIL 24 SHEET 25-2", and "REMOVE 12' AND 12' SEE DETAIL 24 SHEET 25-2".
- Scale and Orientation:** A graphic scale is provided at the bottom left, showing distances from 0' to 150'. A north arrow is also present, pointing towards the top right of the page.

PROJECT REFERENCE NO.

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10

DESIGNER

KIMLEY-HORN

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ROADWAY DESIGN

DATE

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DESIGNER

KIMLEY-HORN

OWNER

ROADWAY DESIGN

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KIMLEY-HORN

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DESIGNER

KIMLEY-HORN

OWNER

ROADWAY DESIGN

DATE

MARCH, NC 2140

PROJECT REFERENCE NO.

R-25308

SHEET NO.

10

Kimley-Horn

431 EASTWAY DRIVE
WILMINGTON, NC 28403
TEL: 771-300-9000
WWW.KIMLEY-HORN.COM

PROJECT REFERENCE NO.	SHEET NO.
R-2530B	16
ROADWAY DESIGN	HYDRAULICS
ENGINEER	ENGINEER

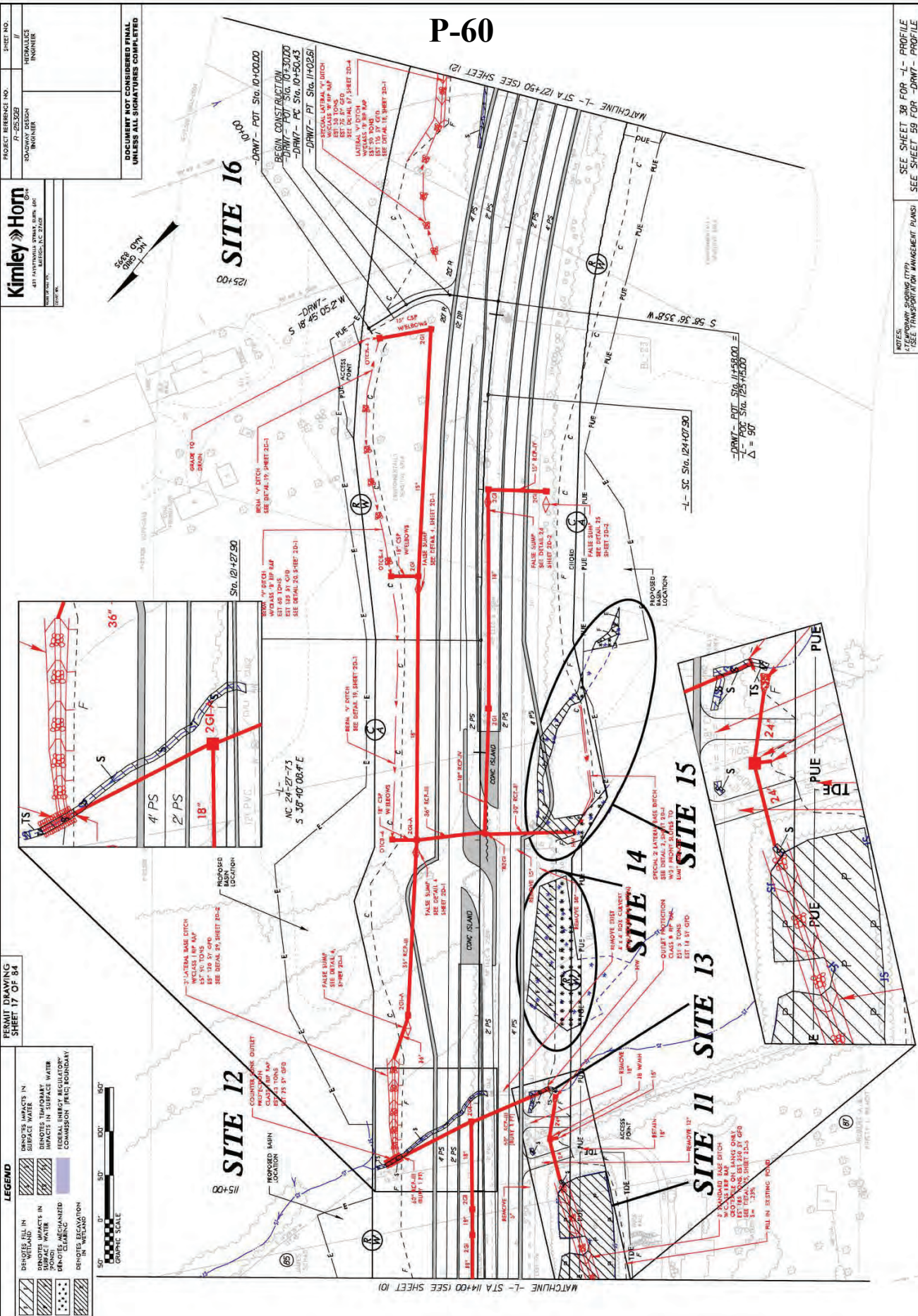
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 17 OF 84

LEGEND	
	DENOTES FILL IN WETLAND
	DENOTES IMPACTS IN SURFACE WATER (POND)
	DENOTES MECHANIZED CLEAVING
	DENOTES EXCAVATION IN WETLAND
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FEDERAL ENERGY REGULATORY COMMISSION (FERC) BOUNDARY



5/14/99



NOTES:
1. TEMPORARY SHORING (TTP)
2. SEE TRANSPORTATION MANAGEMENT PLANS

SEE SHEET 38 FOR L-1 PROFILE
SEE SHEET 59 FOR D-WAY - PROFILE

ROW REV. - 12/17 - REVISED TDE AND DRAINAGE DESIGN ON PARCEL 87 - JWA

10/15/2018

5/14/99

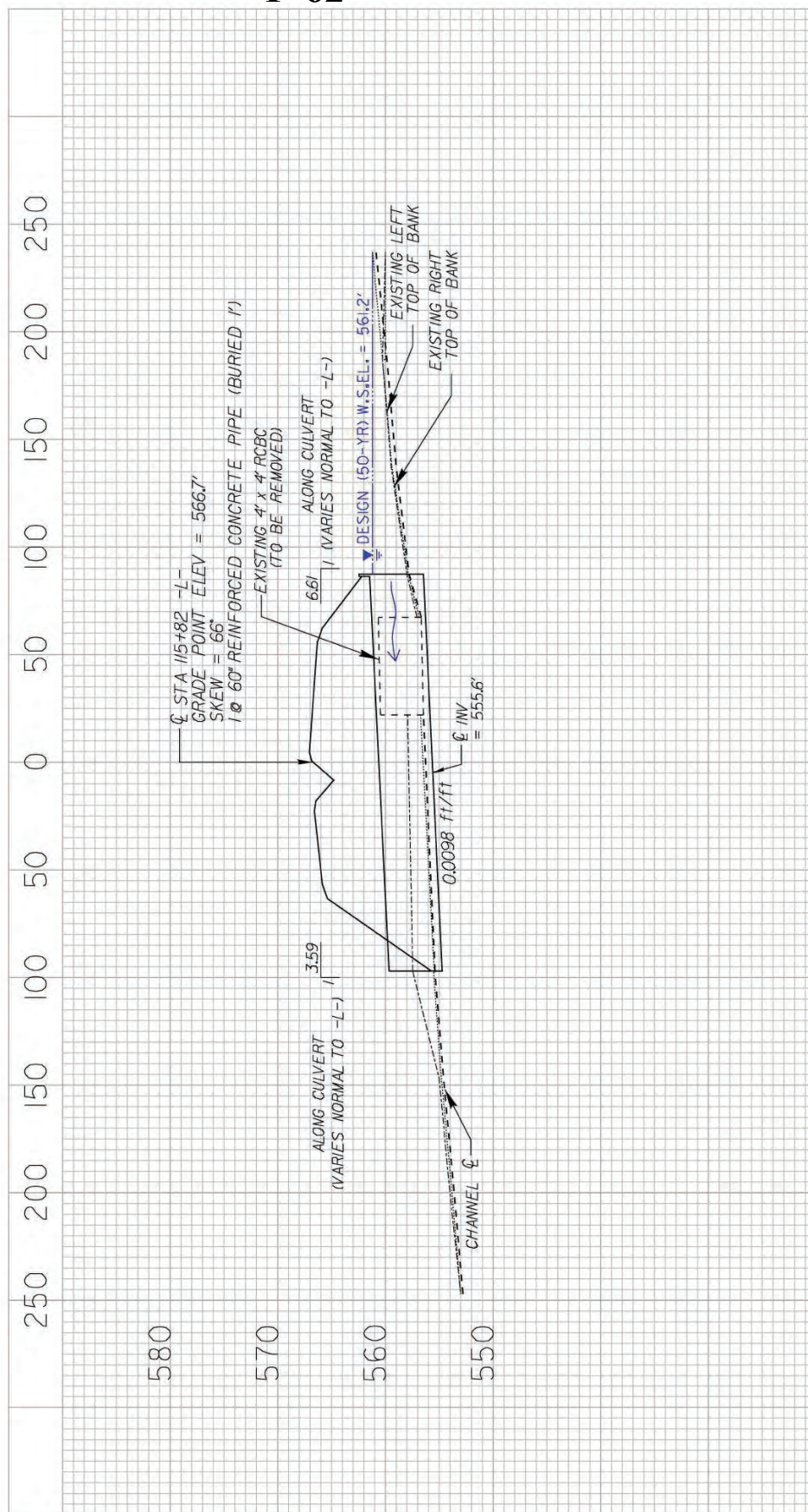
10/15/2018

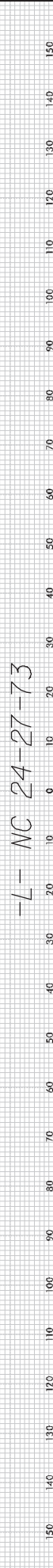
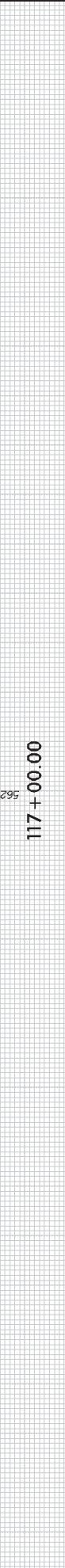
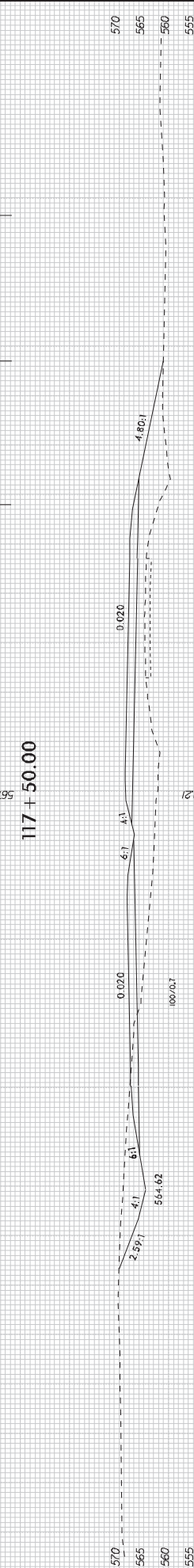
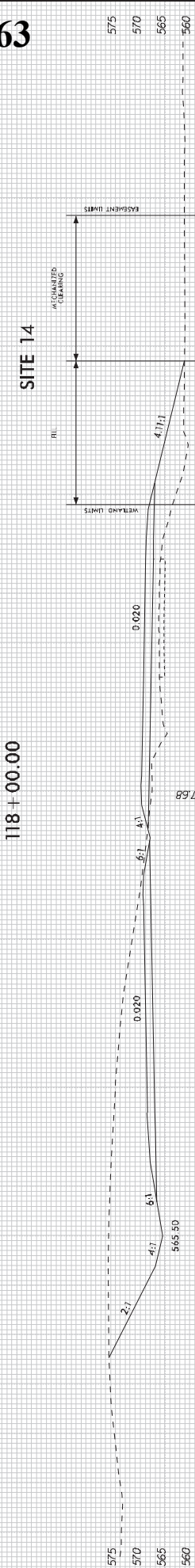
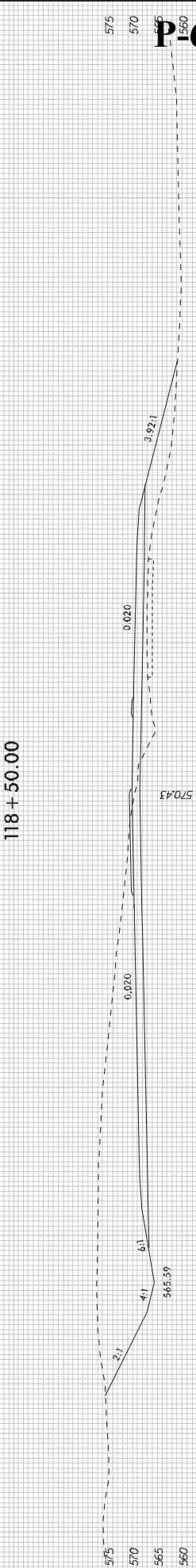
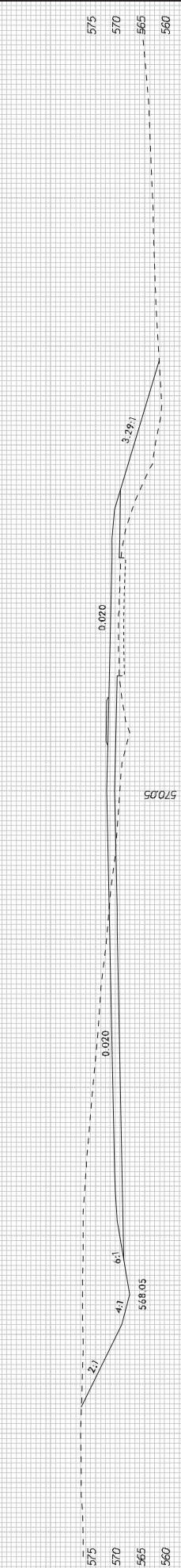
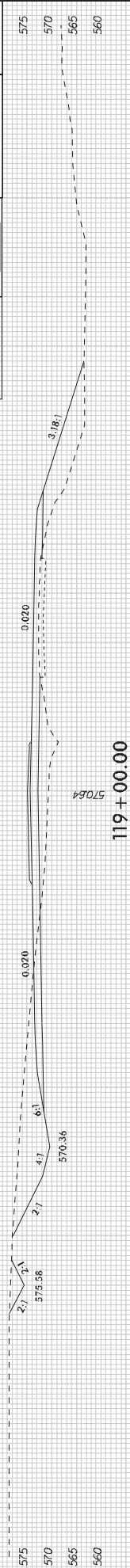
REVISIONS

Kimley-Horn P.O. BOX 35068 • RALEIGH, N.C. 27635-0568 TEL: 919/871-1111 FAX: 919/871-1112	PROJECT REFERENCE NO. P-25309	SHEET NO. 19 OF 84
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

SITE 12 & 13

PERMIT DRAWING
SHEET 19 OF 84

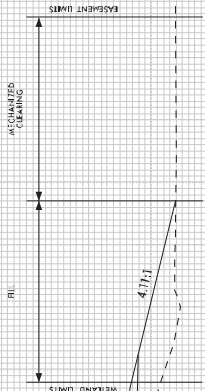


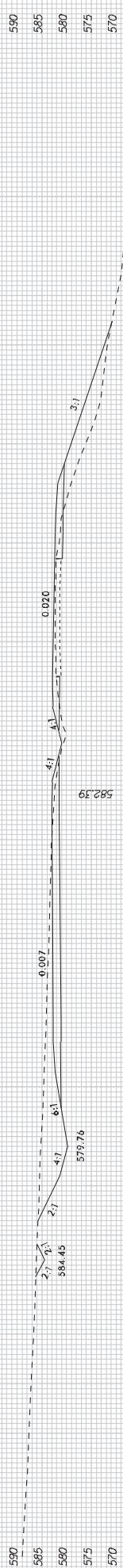


-L- NC 24-27-73

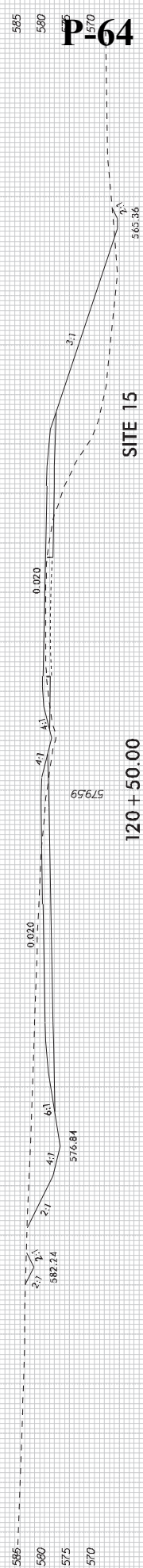
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SITE 14

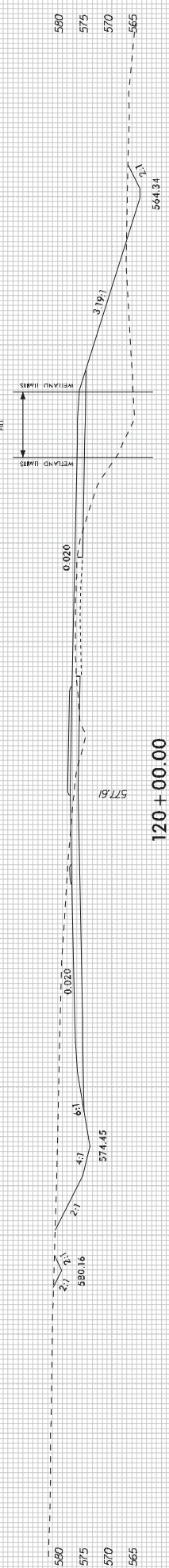




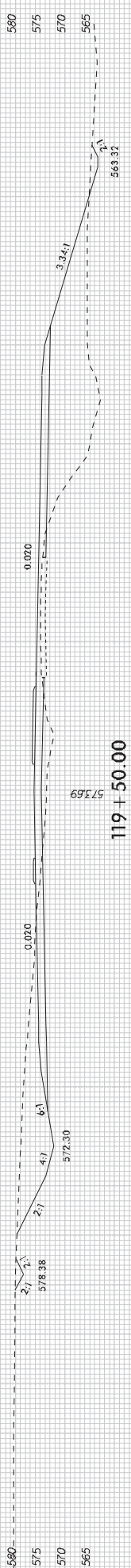
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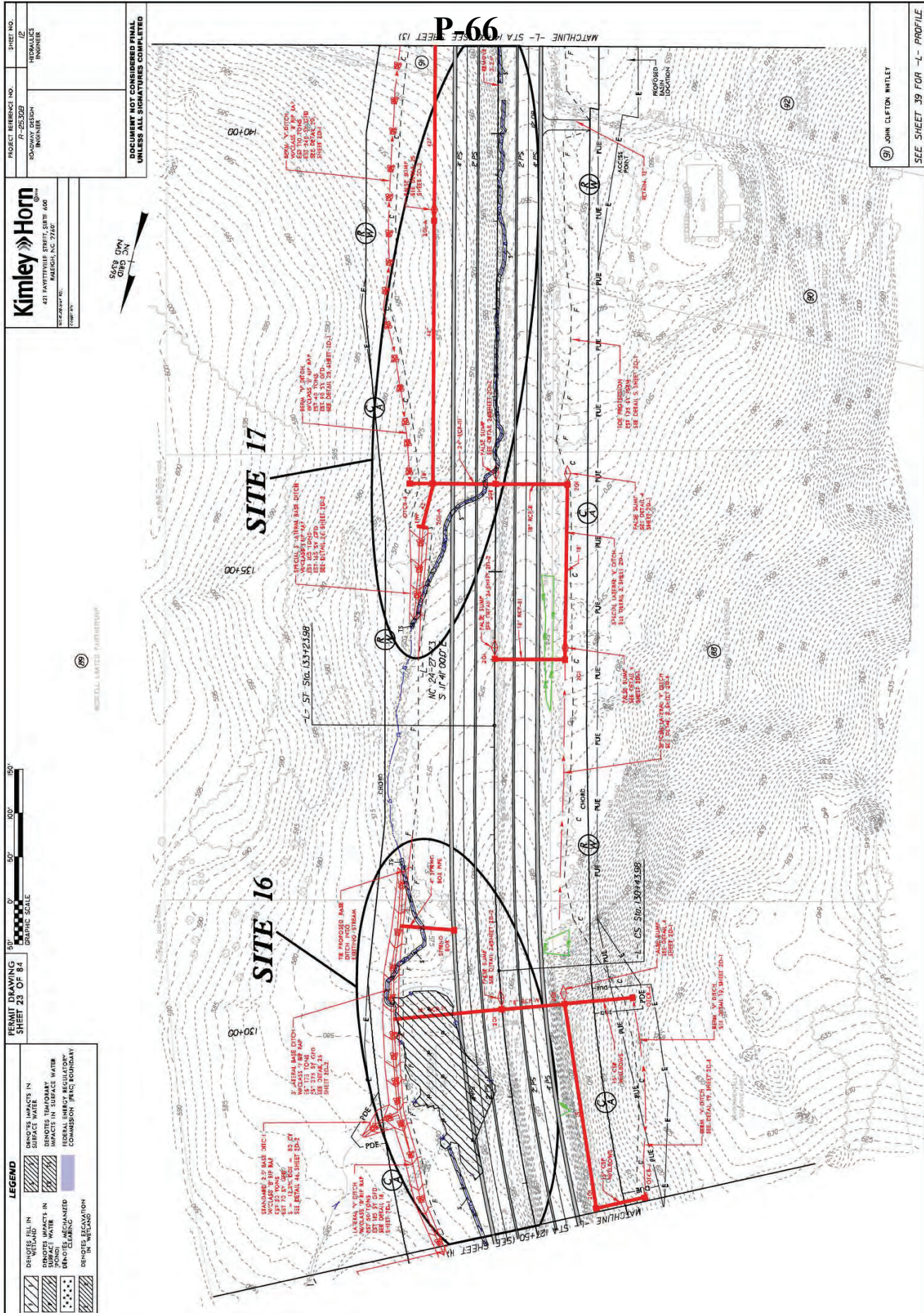


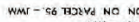
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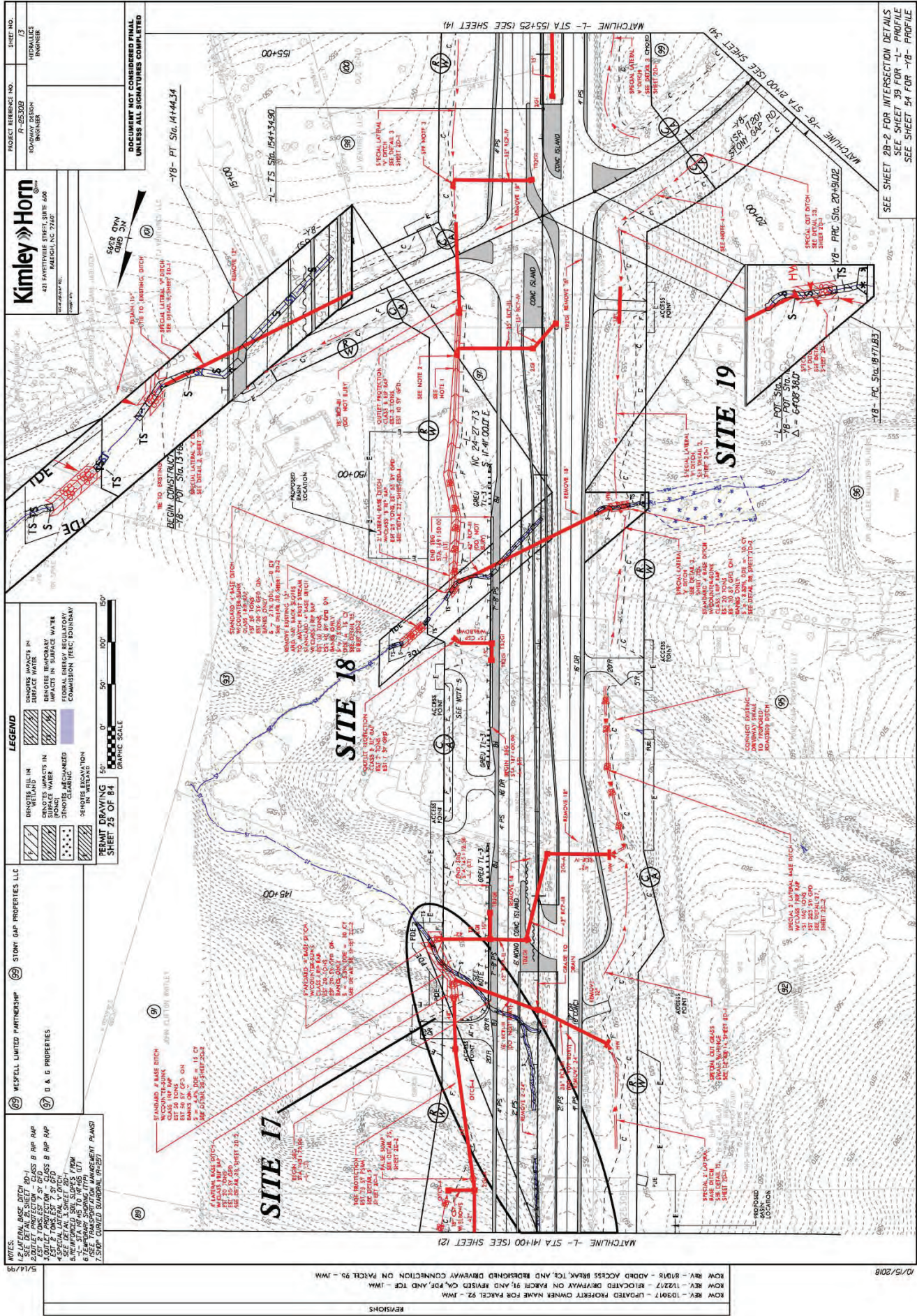
-L- NC 24-27-73

PROJECT REFERENCE NO.	SHEET NO.
R-2530B	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**







Kimley-Horn
421 FANTASY STREET, SUITE 400
RICHMOND, NC 27107
TEL: 704.343.7100
WWW.KIMLEY-HORN.COM

PROJECT REFERENCE NO. **P-25308**
SHEET NO. **13**
HYDRAULIC DESIGN
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

NOTES:

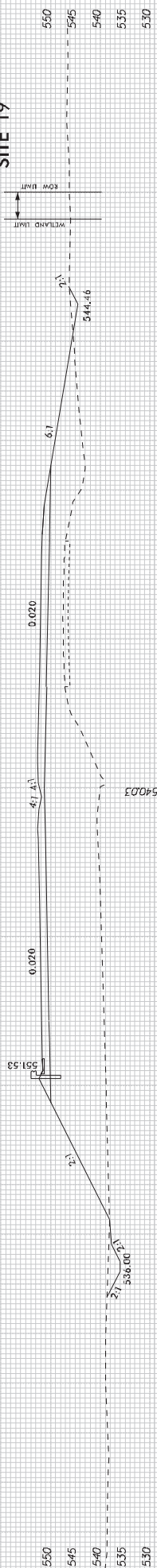
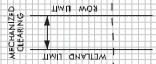
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REVISIONS:

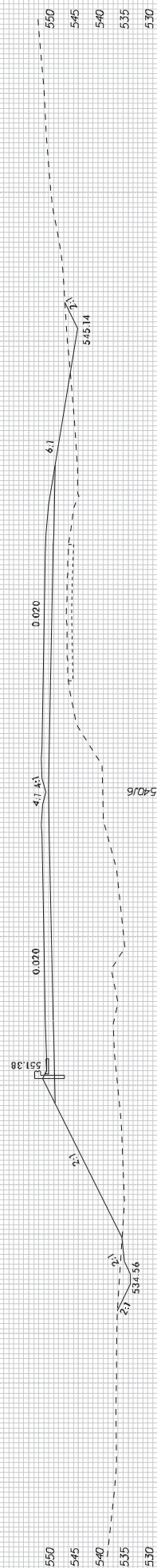
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2	REVISED PROPERTY OWNER NAME FOR PARCEL 91 AND REVISED CA, DCF, AND TCE - JWA	10/15/2018
3	REVISED ACCESS BREAK, TCE, AND RELOCATED DRIVEWAY CONNECTION ON PARCEL 95 - JWA	10/15/2018

SEE SHEET 2B-2 FOR INTERSECTION DETAILS
SEE SHEET 3B FOR L-1 PROFILE
SEE SHEET 5A FOR L-1B PROFILE

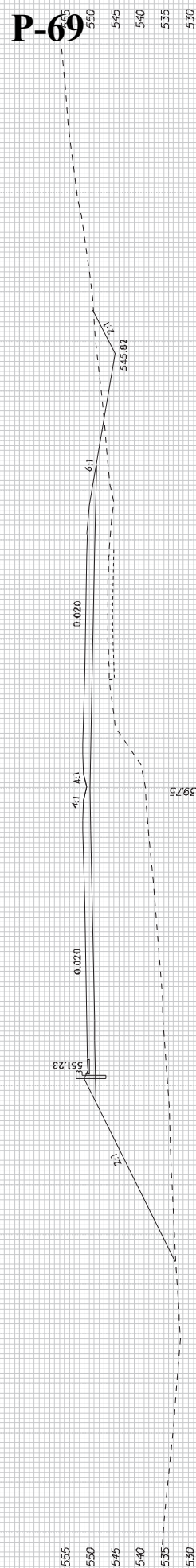
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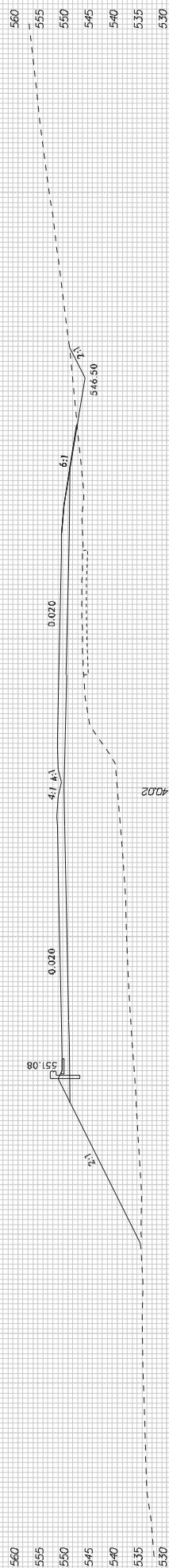
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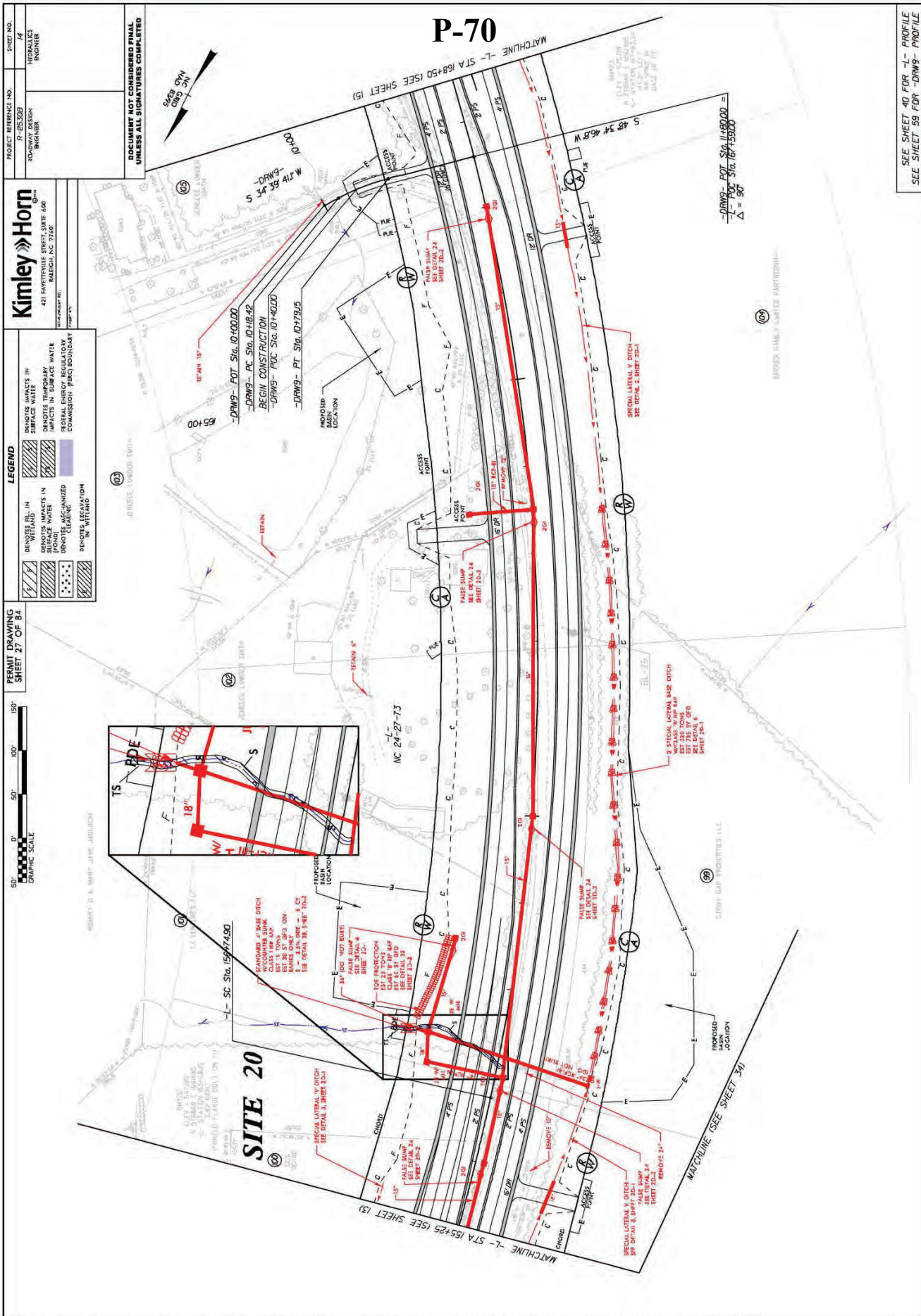
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-L- NC 24-27-73

P-69

SEE SHEET 40 FOR -L- PROFILE
SEE SHEET 59 FOR -DRW9- PROFILE

P-70



P-70

MATCHLINE - L- STA 68+50 (SEE SHEET 15)

V.C. 68+50 TO 69+50

STATION 68+50 STATION 69+00 STATION 69+50

ELEVATION 27.00' 27.00' 27.00'

EXISTING GROUND SURFACE

PROPOSED ROADWAY GRADE

NORTH

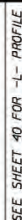
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PROJECT REFERENCE NO. R-2532B
ROADWAY DESIGN ENGINEER

SHEET NO. 14
HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEE SHEET 40 FOR "L- PROFILE"
SEE SHEET 59 FOR "DRAWN- PROFILE"



0/15/2018

PROJECT REFERENCE NO.	R-25309	SHEET NO.	15
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

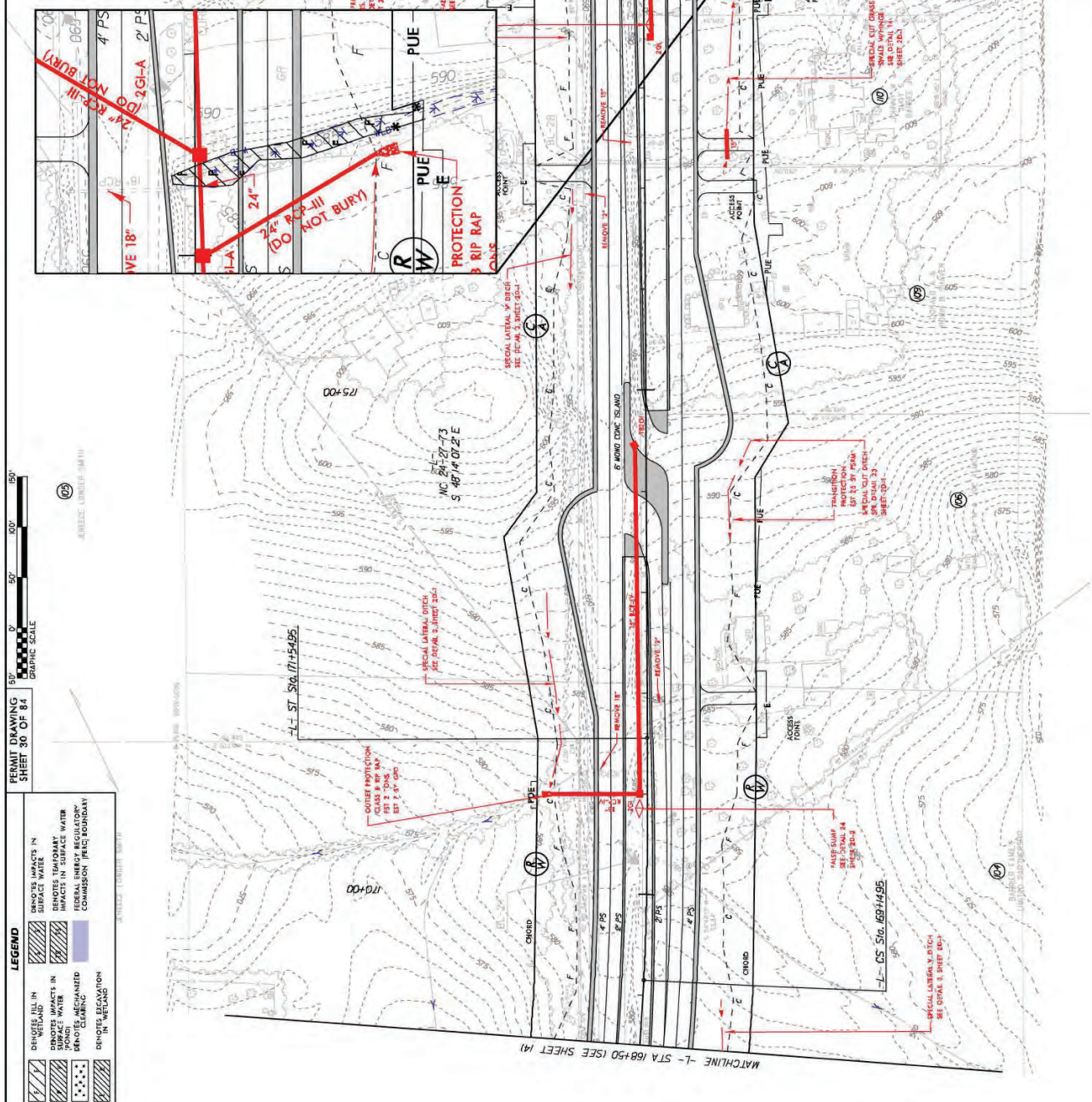
Kimley»Horn 
421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601
919.972.4444 FAX 919.972.4444

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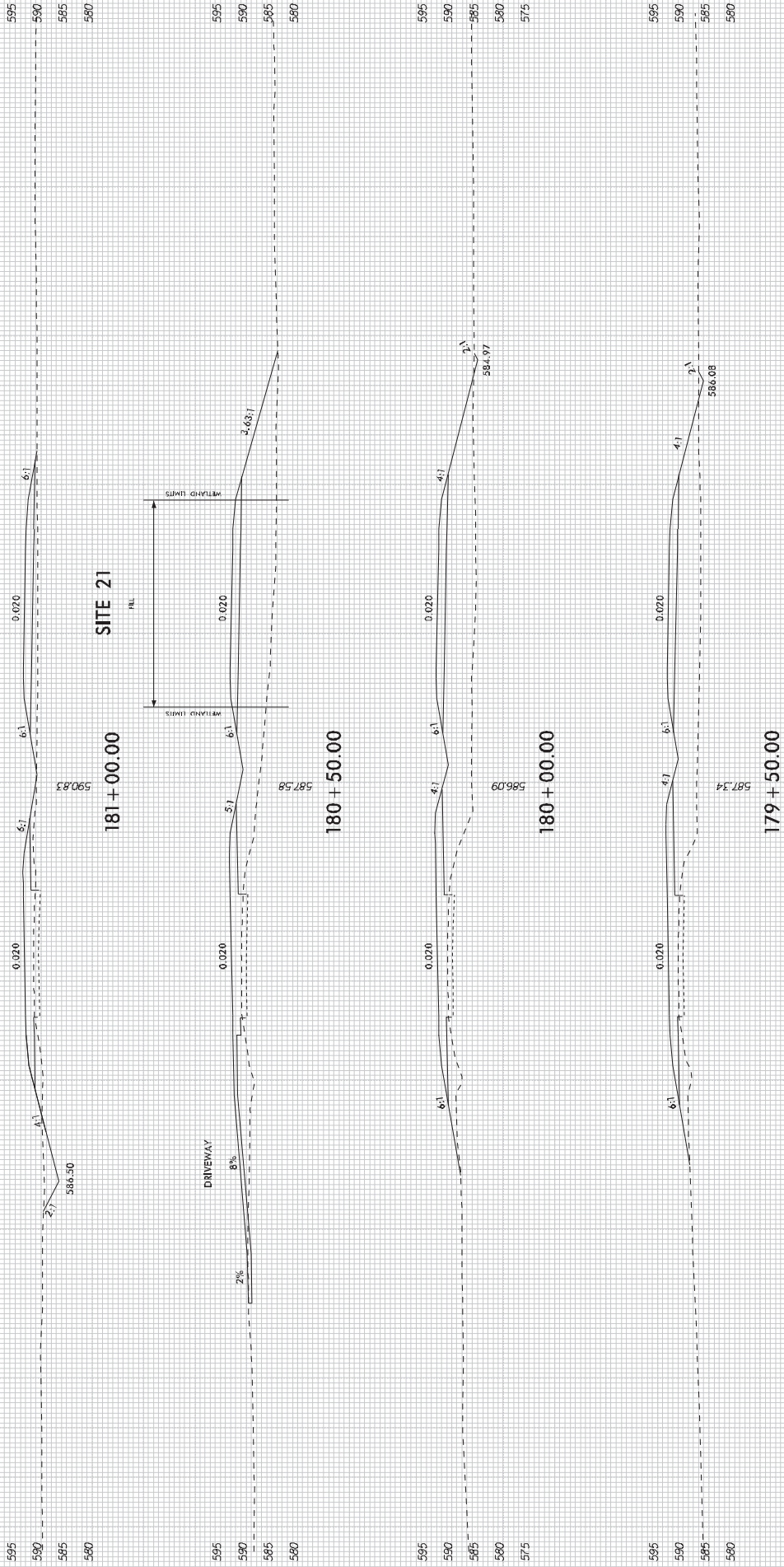
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FIRE DEPARTMENT

113 TROY A & CRYSTAL
F STOCKTON

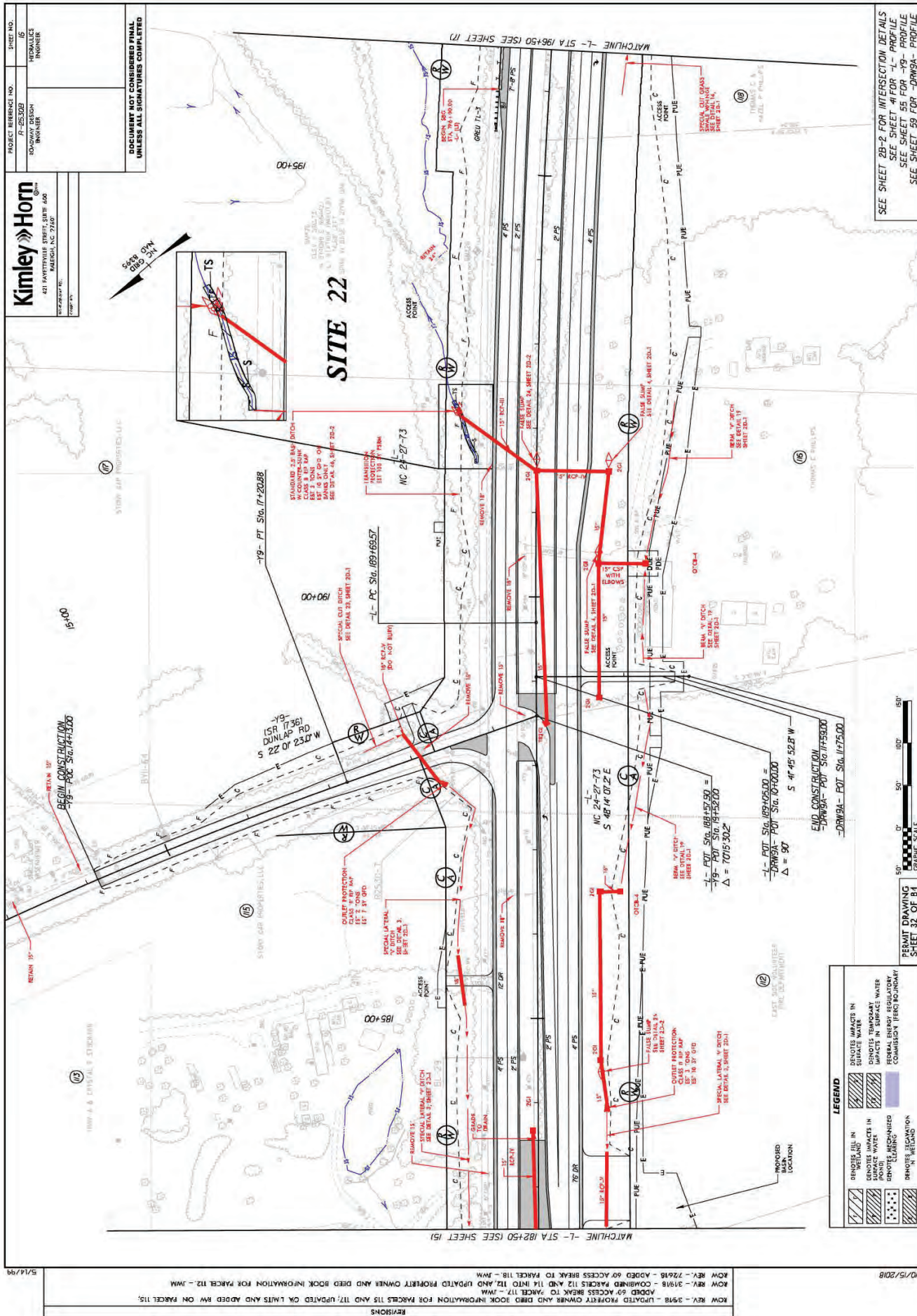
SEE SHEET 40 FOR -L- PROFILE



PERMIT DRAWING SHEET 31 OF 84	0 5 10	PROJ. REFERENCE NO. R-25509	SHEET NO.
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-L- NC 24-27-73



10/15/2018

5/14/19

Kimley-Horn

421 PATTERSON STREET, SUITE 400
FARMERSVILLE, NC 27834
PHONE: 703.281.1100
WWW.KIMLEY-HORN.COM

PROJECT REFERENCE NO. R-25303
SHEET NO. 16
HYDRAULICS ENGINEER

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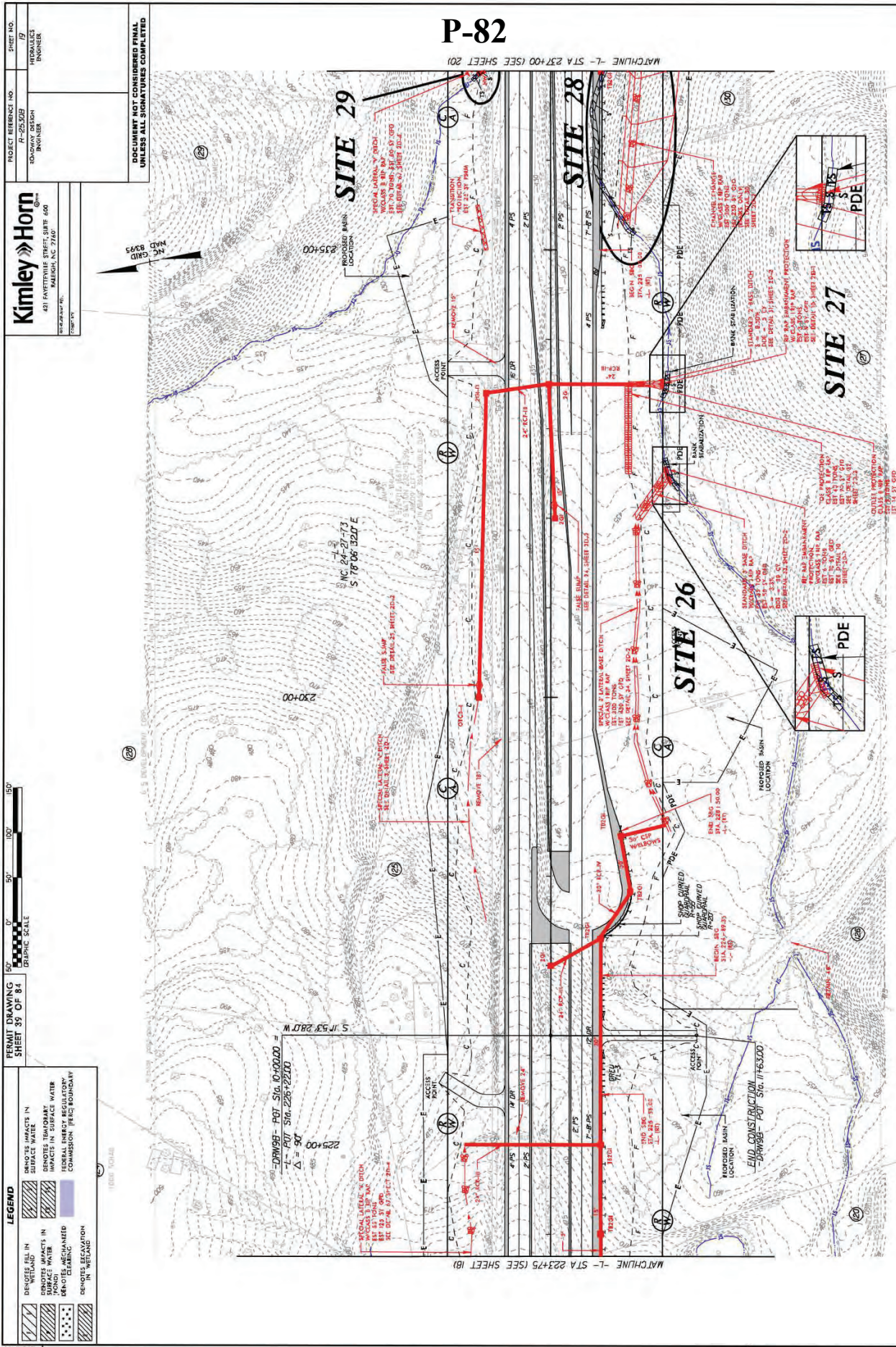
SEE SHEET 28-2 FOR INTERSECTION DETAILS
SEE SHEET 4 FOR -L- PROFILE
SEE SHEET 55 FOR -R- PROFILE
SEE SHEET 59 FOR -DRAWN- PROFILE

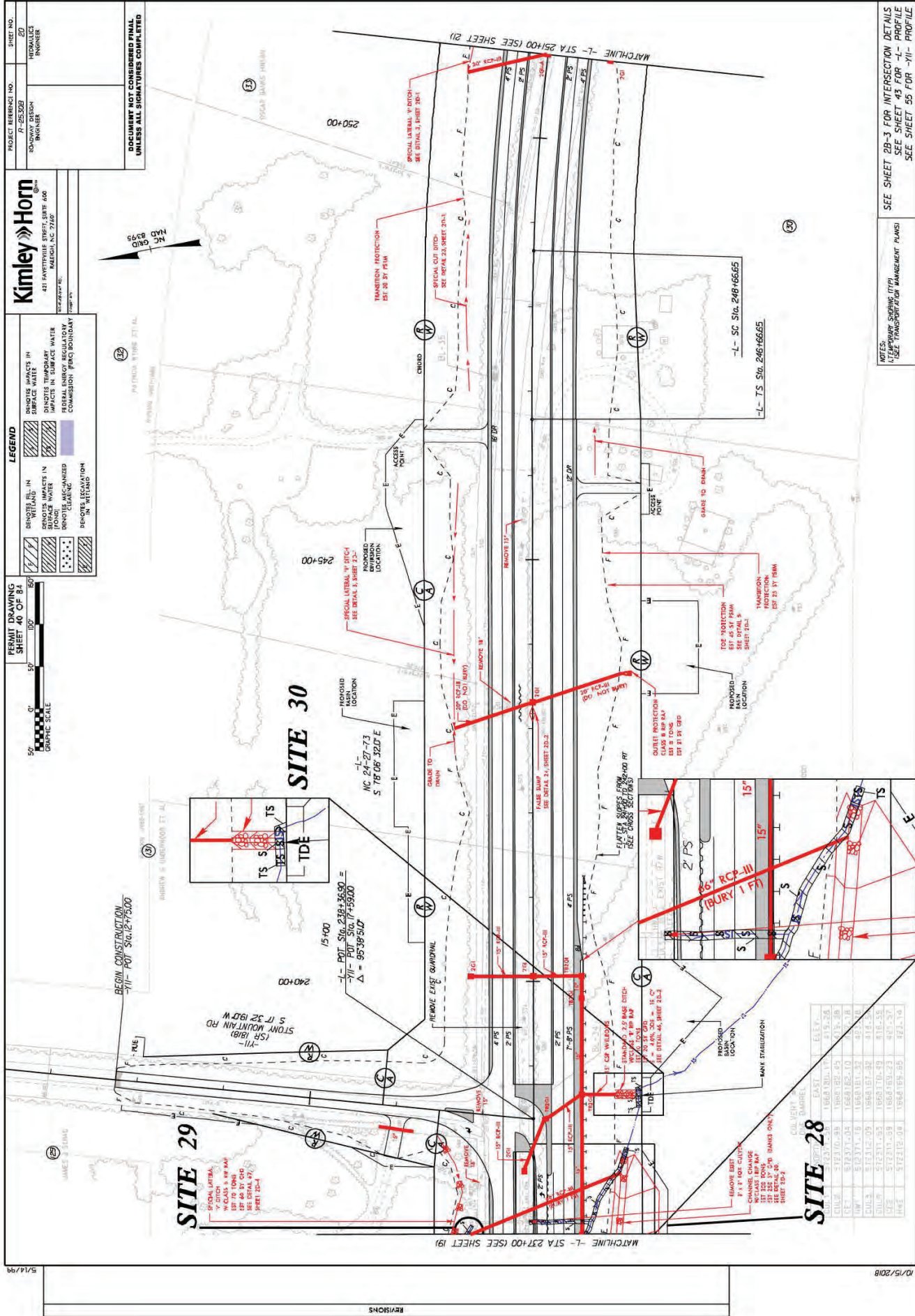





V. REV. - 7/26/18 - ADDED 60' ACCESS BREAK TO PARCEL 127. - JWM

REVISIONS







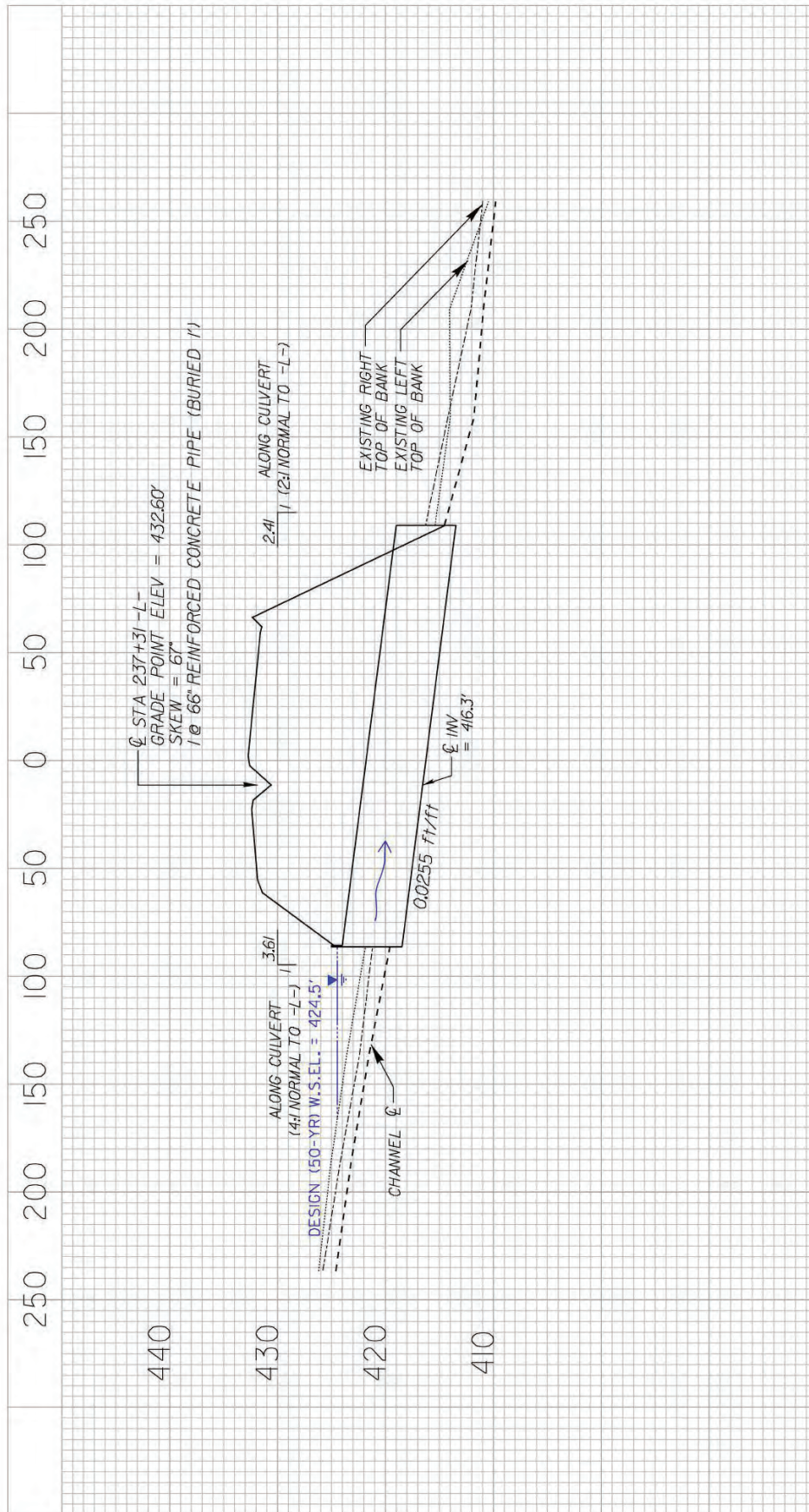
 P.O. BOX 35068 • RALEIGH, N.C. 27635-0608 TEL: 919/881-1000 FAX: 919/881-1001	PROJECT REFERENCE NO. P-25309	SHEET NO. 42 OF 54
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 42 OF 54

SITE 28 & 29

P-85



5/14/99

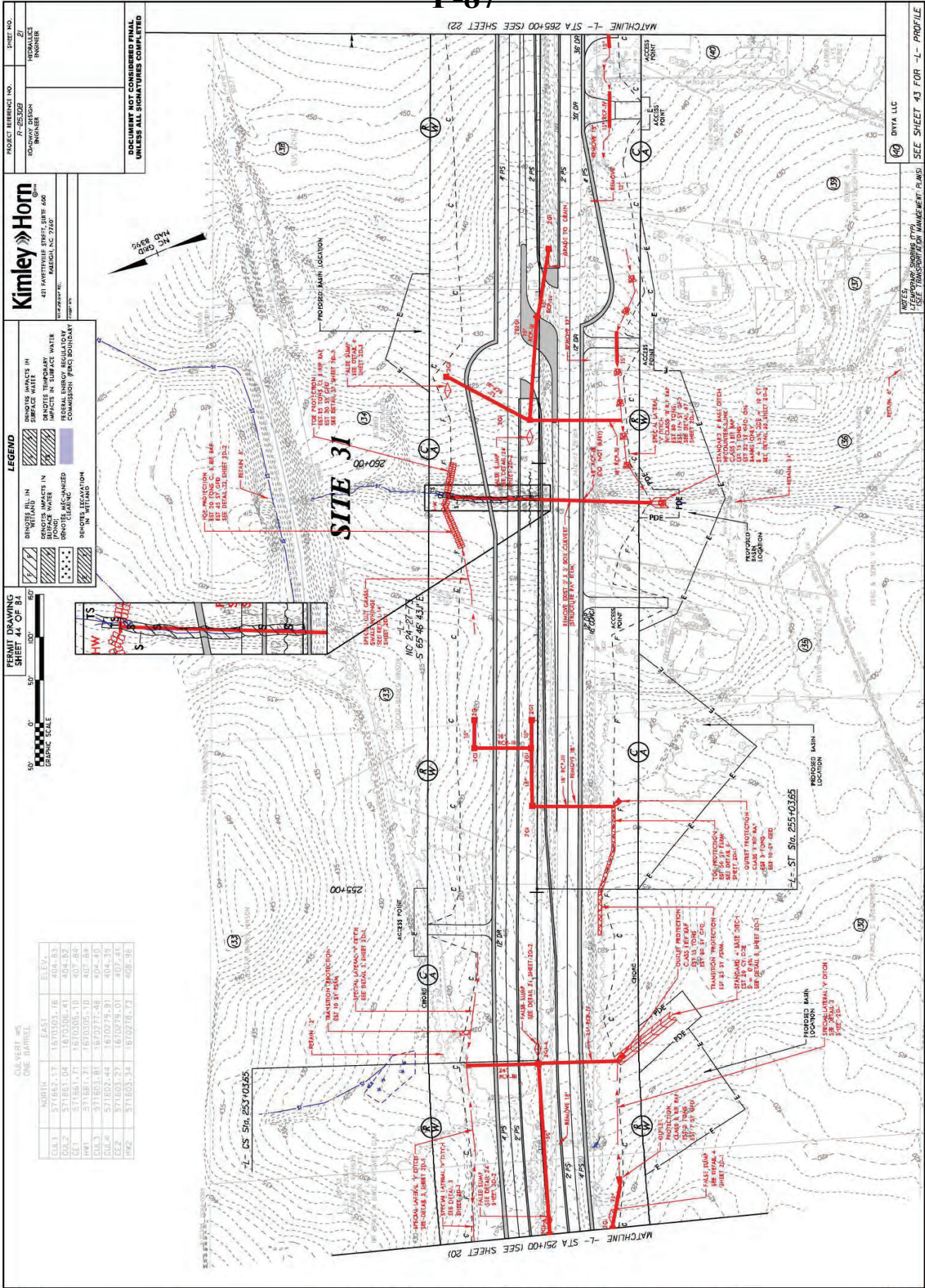
10/15/2018

REVISIONS

Kimley»»Horn
421 FAVERVILLE STREET, SUITE 600
RALEIGH, NC 27601

10

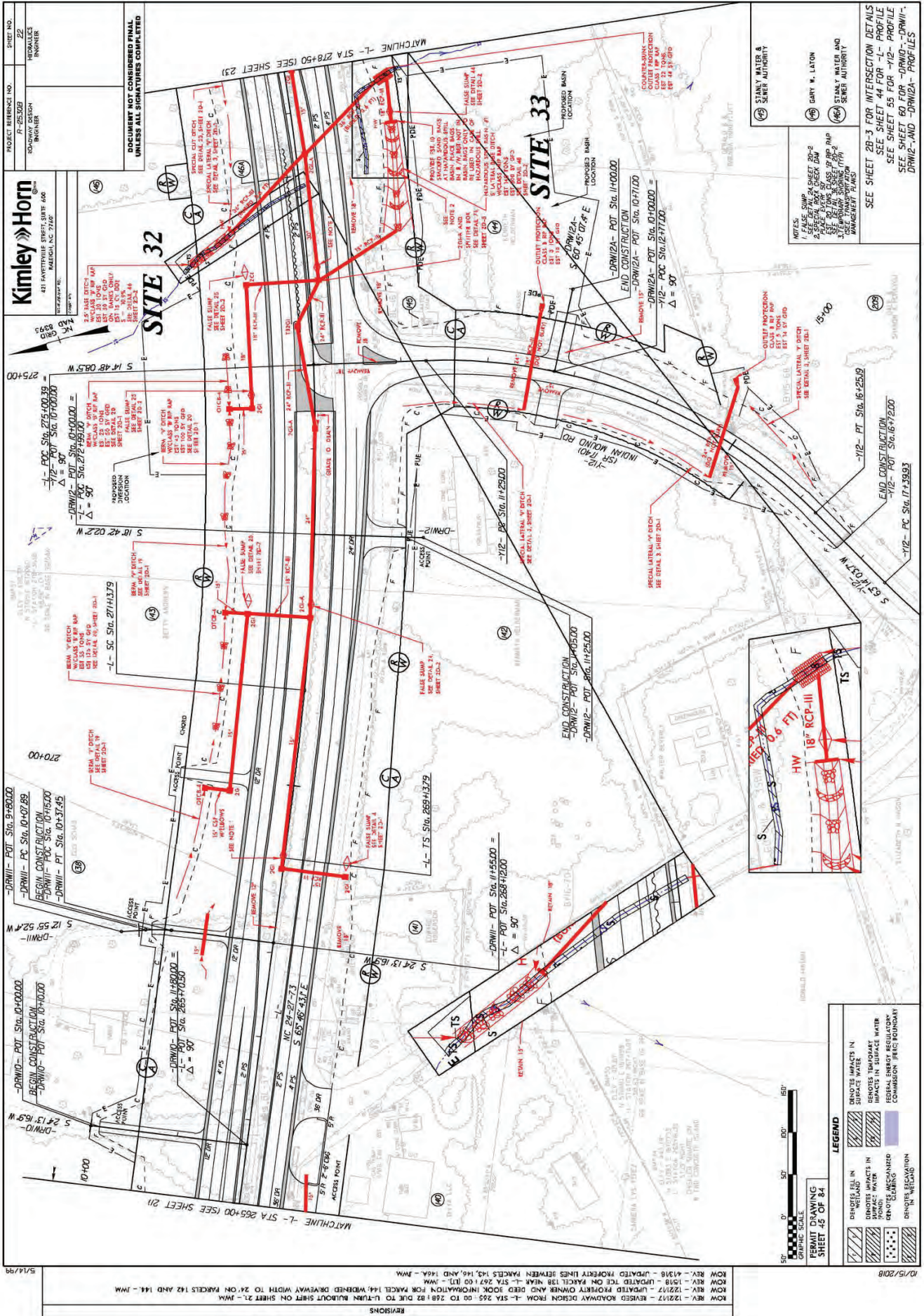


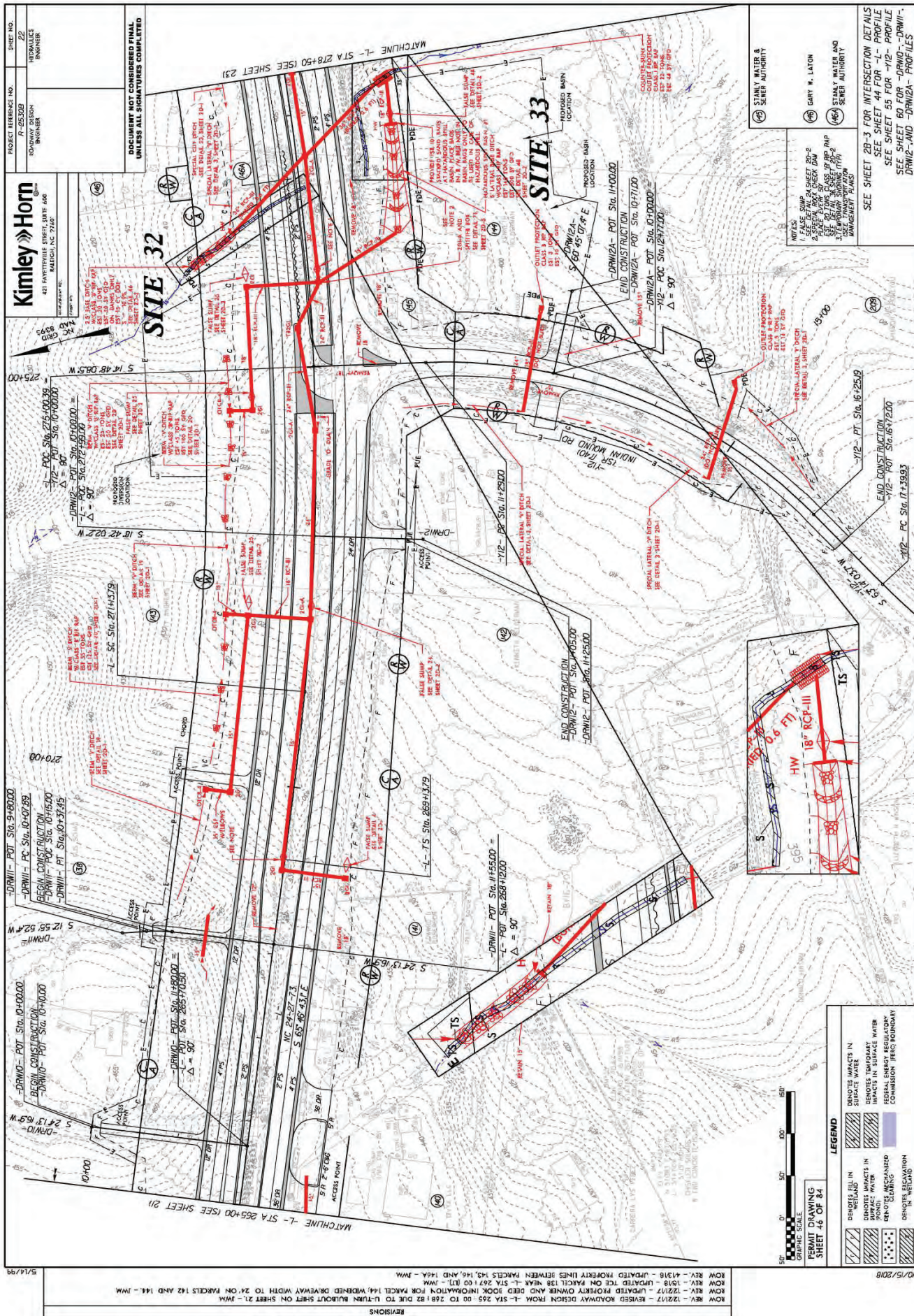


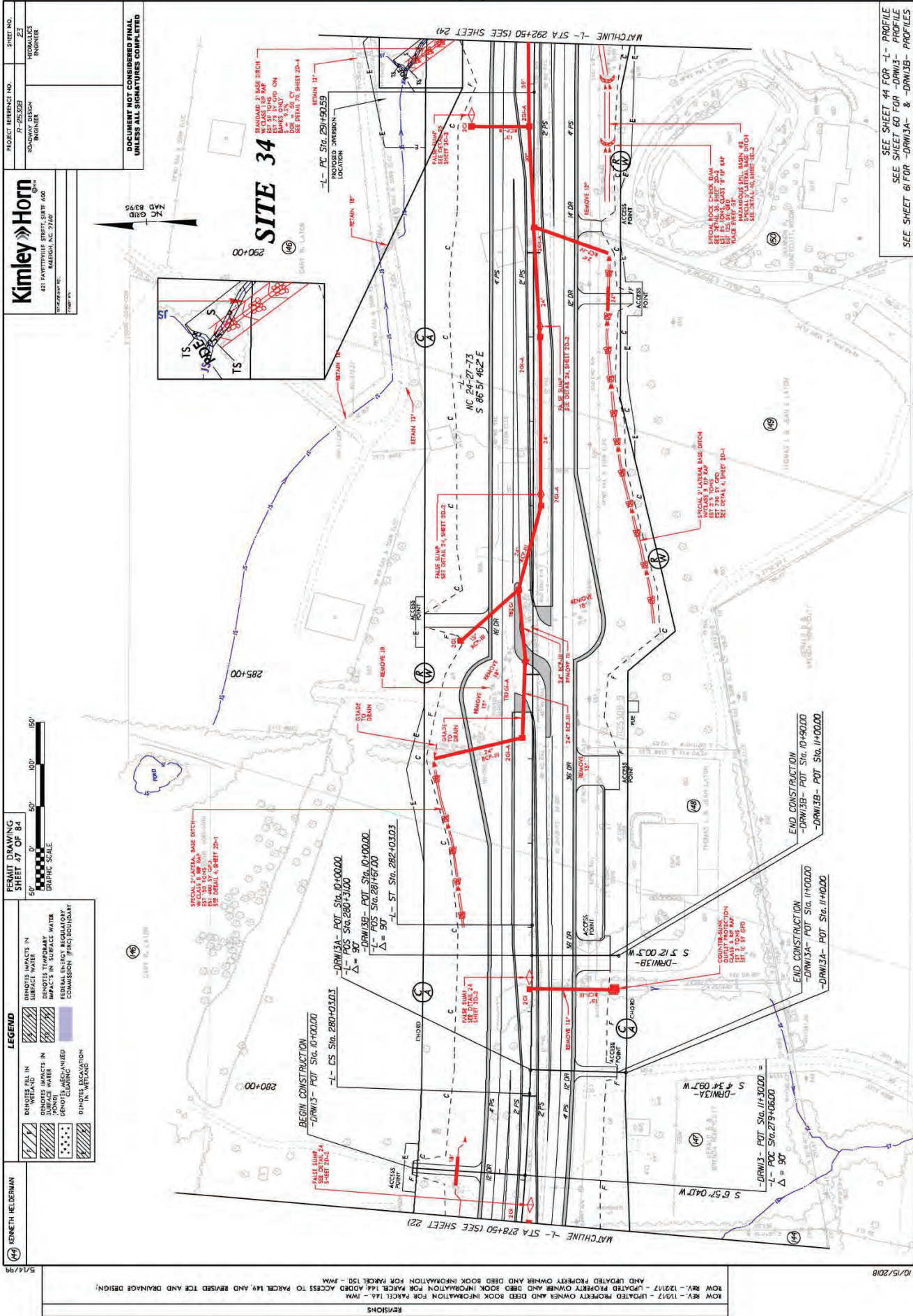
CULVERT #10
ONE BARRIEL

	NORTH	EAST	ELEV.
CUL.1	571662.17	1670303.16	404.83
CUL.2	571663.04	1670306.41	404.82
CUL.3	571663.71	1670309.10	407.84
CUL.4	571663.81	1670312.48	404.80
CUL.5	571662.44	1670279.81	404.79
CUL.6	571663.27	1670278.01	407.43
CUL.7	571663.34	1670278.73	408.95

DESIGN REV. - 10/15/2018 - WIDENED DRIVEWAY AND LENGTHENED DRIVEWAY PIPE ON PARCELS 137 - JWA
ROW REV. - 10/15/2018 - REVISED PROPERTY LINE BETWEEN PARCELS 133 AND 134 AND BETWEEN 134 AND 138 - JWA
ROW REV. - 10/15/2018 - ADDED ACCESS TO PARCELS 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

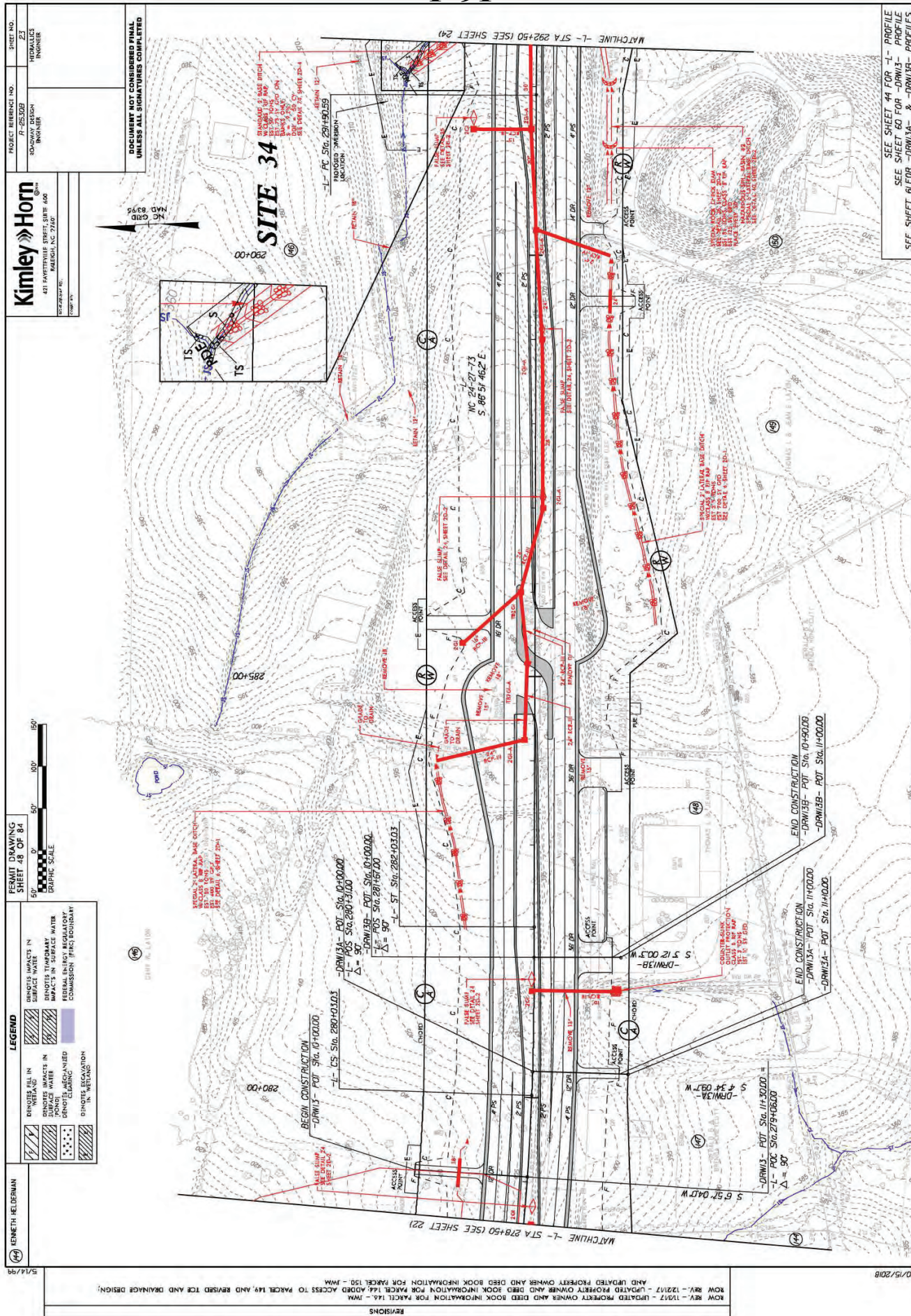






SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 60 FOR -DRAIN- PROFILES
SEE SHEET 61 FOR -DRAIN- & -DRAIN- PROFILES

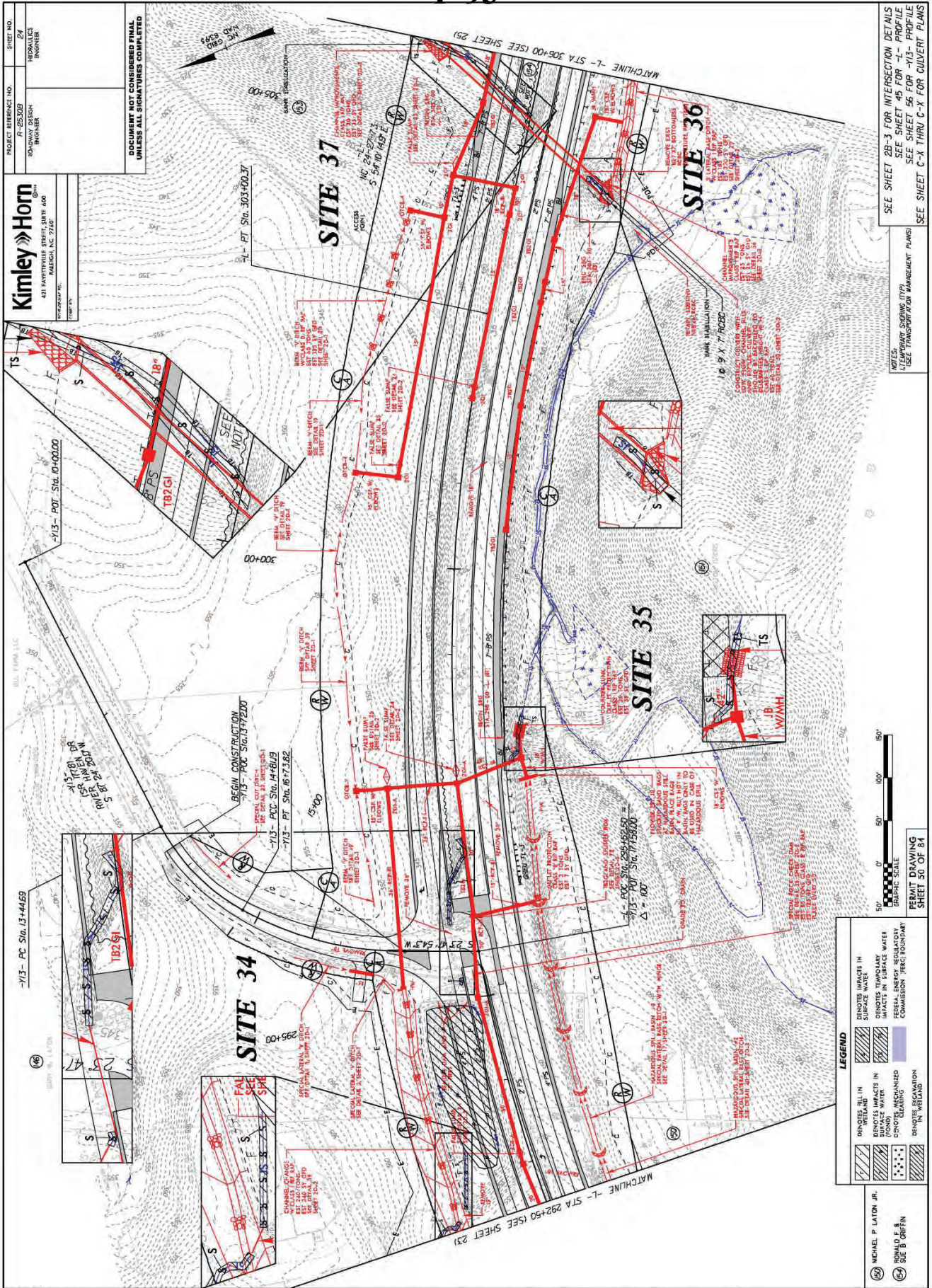
FOR REV. 11/21/17 - UPDATED PROPERTY OWNER AND BEDD BOOK INFORMATION FOR PARCEL 145 - INVA AND UPDATED PROPERTY OWNER AND BEDD BOOK INFORMATION FOR PARCEL 150 - INVA
FOR REV. 12/21/17 - UPDATED PROPERTY OWNER AND BEDD BOOK INFORMATION FOR PARCEL 145 - INVA AND UPDATED PROPERTY OWNER AND BEDD BOOK INFORMATION FOR PARCEL 150 - INVA



SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 60 FOR -DRAW13- PROFILE
SEE SHEET 61 FOR -DRAW13A- & -DRAW13B- PROFILES

REVISIONS	
ROW	REV. - 12/21/17 - UPDATED PROPERTY OWNER AND DEED BOOK INFORMATION FOR PARCEL 146 - JMW
ROW	REV. - 12/21/17 - UPDATED PROPERTY OWNER AND DEED BOOK INFORMATION FOR PARCEL 150 - JMW
ROW	REV. - 12/21/17 - UPDATED PROPERTY OWNER AND DEED BOOK INFORMATION FOR PARCEL 151 - JMW

0/15/2018



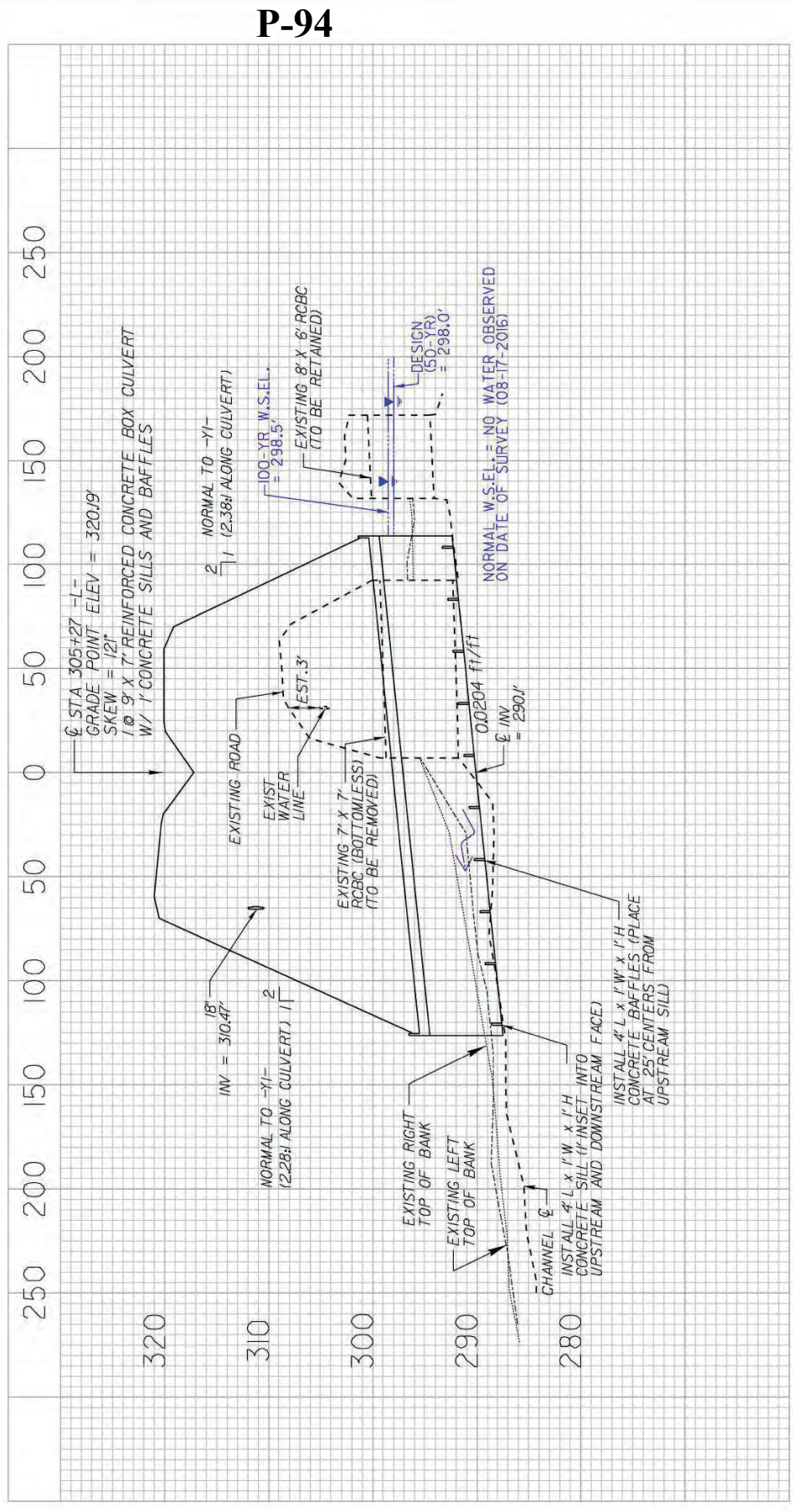
10/15/2018

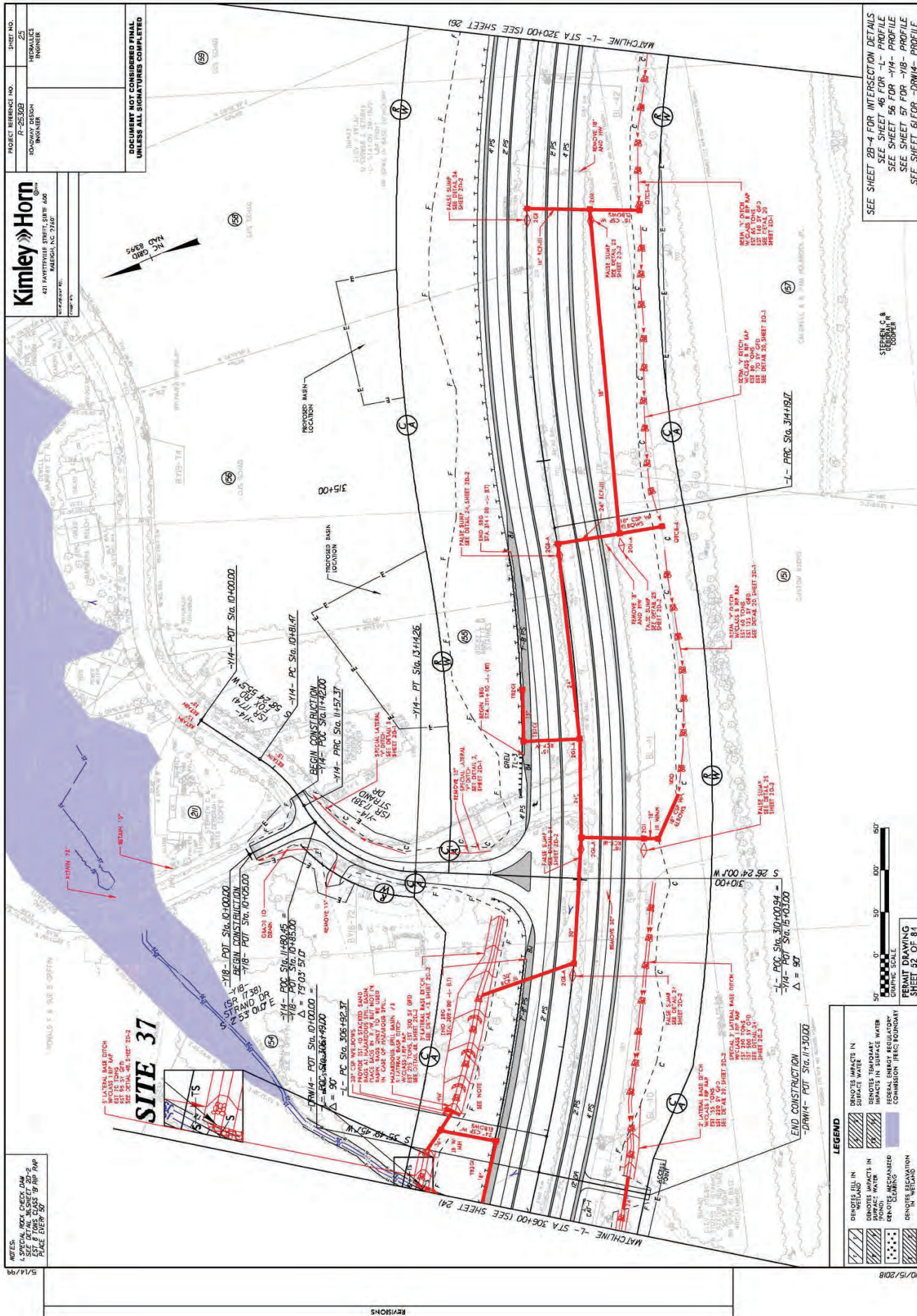
ROW REV. - 11/17 - UPDATED PROPERTY OWNER AND DEED BOOK INFORMATION FOR PARCELS 146 AND 152. - JWM

REVISIONS

5/14/99

SITE 36 & 37





SEE SHEET 2B-4 FOR INTERSECTION DETAILS
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 56 FOR -Y14- PROFILE
SEE SHEET 57 FOR -Y18- PROFILE
SEE SHEET 61 FOR -DAN14- PROFILE

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GRAPHIC SCALE

PERMIT DRAWING
SHEET 53 OF 81

LEGEND

DENOTES IMPACTS IN SURFACE WATER

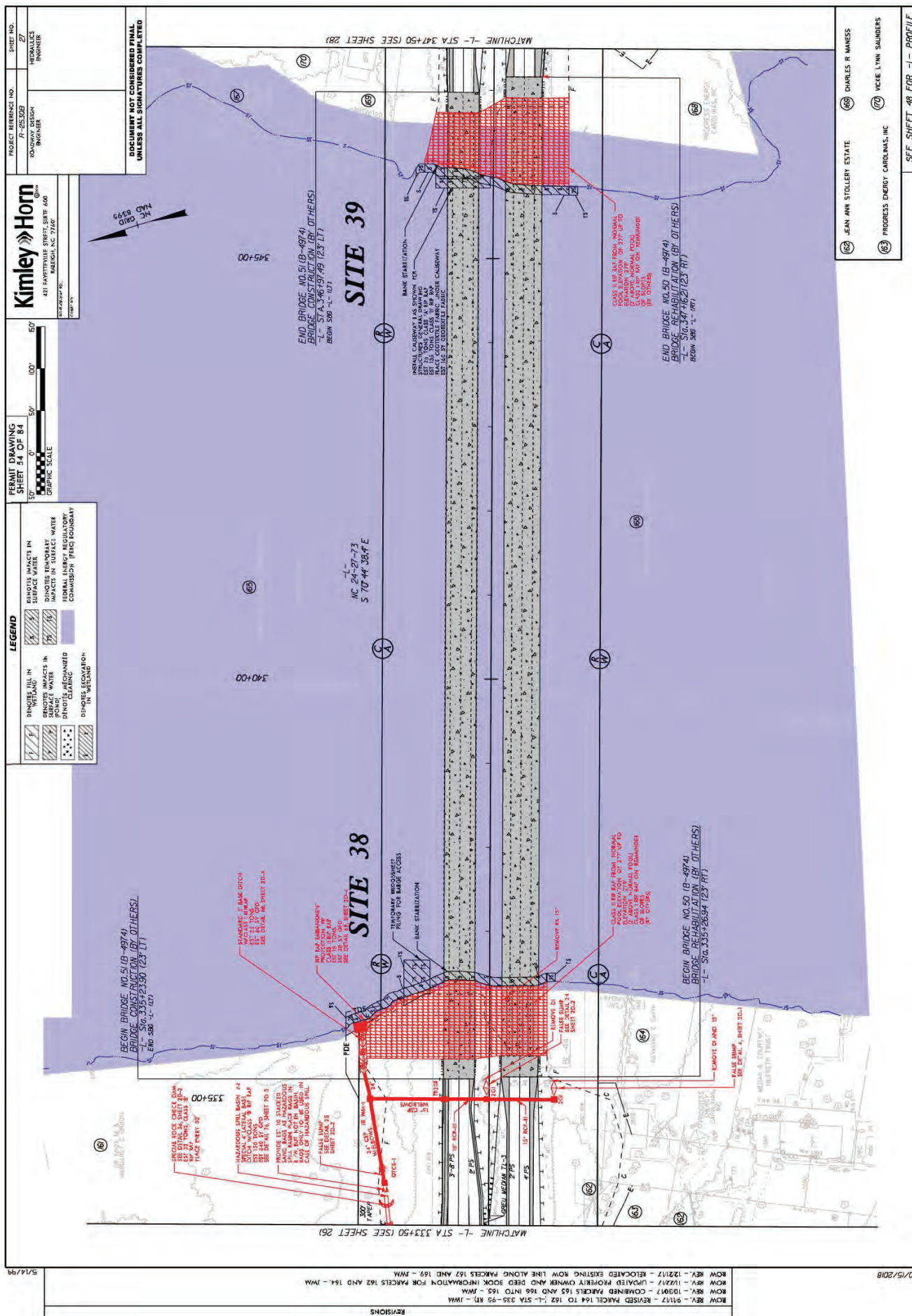
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

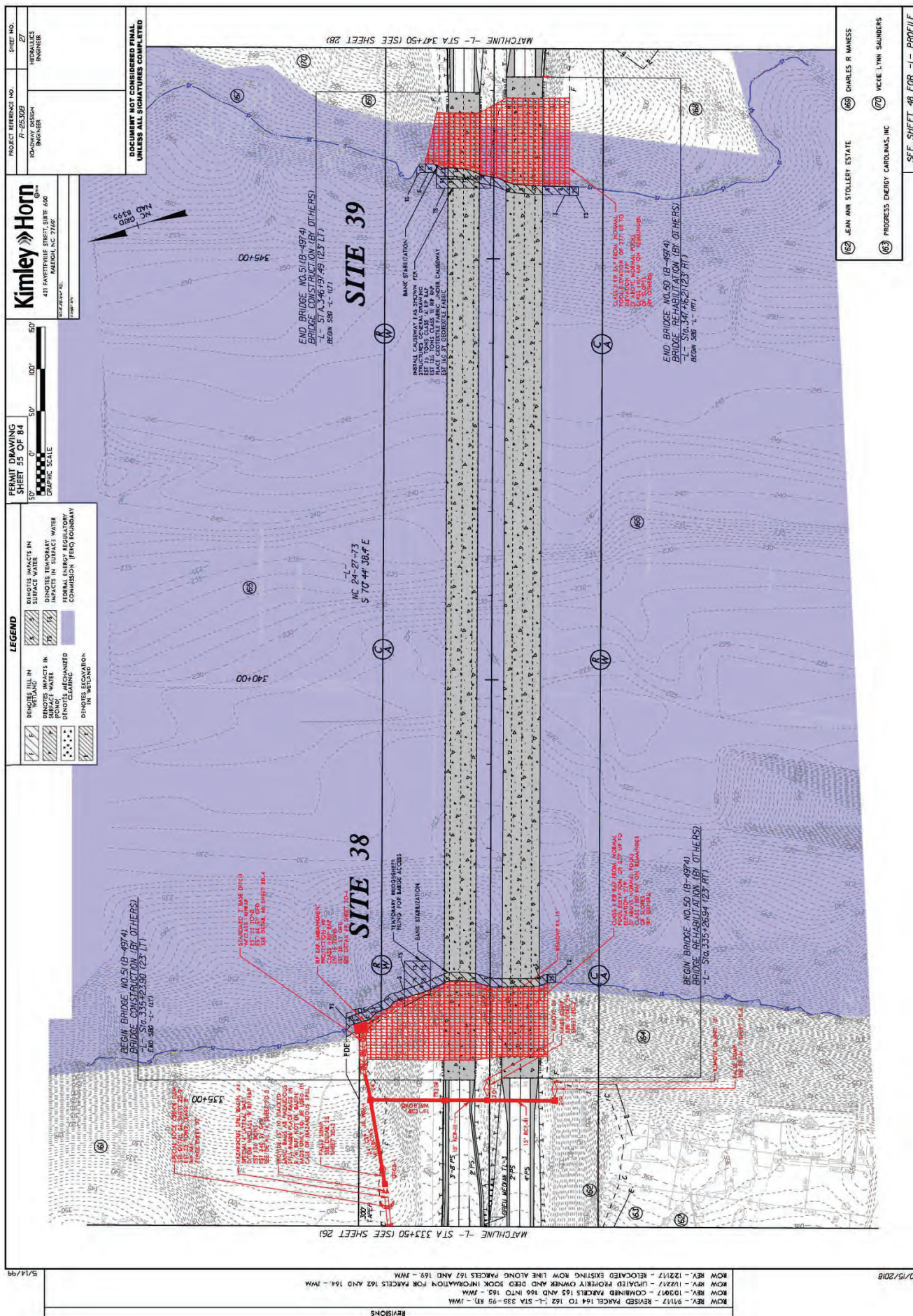
FEDERAL ENERGY REGULATORY COMMISSION (FERC) PROJECT


	DENOTES FILL IN WETLAND
	DENOTES IMPACTS IN SURFACE WATER (POND)
	DENOTES MECHANIZED CLEARING
	DENOTES EXCAVATION IN WETLAND

10/15/2018

NOTES:
1. SPECIAL
SEE ON
EST 8
PLACE

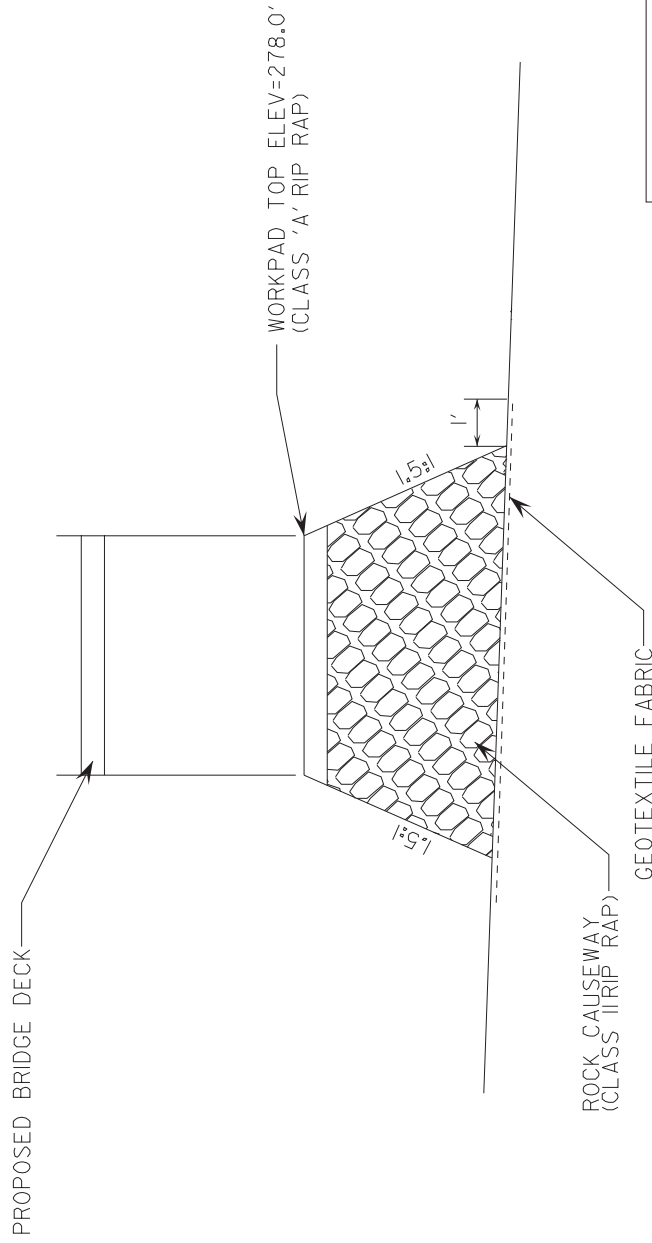




 P.O. BOX 1048 • KALAMAZOO, MI 49001-0408 TEL: 269.382.1100 FAX: 269.382.1101	PROJECT REFERENCE NO. R-2530B	SHEET NO. P-99
	COUNTY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	PERMIT DRAWING SHEET 135A OF 184
--	-------------------------------------

CAUSEWAY 1 DETAIL (NOT TO SCALE)



QUANTITIES OF ESTIMATES: CAUSEWAY 1
 VOLUME OF CLASS 'A' RIP RAP= 18 yds³
 AREA OF CLASS 'A' RIP RAP= 0.011 acres
 Estimate 25 Tons Class 'A' Rip Rap
 VOLUME OF CLASS II RIP RAP= 100 yds³
 AREA OF CLASS II RIP RAP= 0.030 acres
 Estimate 135 Tons Class II Rip Rap
 Estimate 160 SY of Geotextile Fabric

NCDOT

DIVISION OF HIGHWAYS
 STANLY / MONTGOMERY COUNTY
 PROJECT: R-2530B
 BRIDGE ON NC 24 / 27 / 73
 WESTBOUND OVER
 PEE DEE RIVER

10 / 15 / 2018

P-99

5/14/99

REVISIONS

10/15/2018

PROJECT REFERENCE NO.	R-2530B
ROADWAY DESIGN ENGINEER	

DOCUMENT NOT TO BE
 USED WITHOUT ALL SIGNATURES

Kimlin
421 FAYETTE ST.
NASHVILLE, TENN.

OT Sta. 10+00
C Sta. 10+00
W CONST
- POC STA
OT STA

Time (h)	Walking (% TEE)	Standing (% TEE)
0	0	0
1	10	10
2	25	75
3	25	75
4	25	75
5	25	75
6	25	75
7	25	75
8	25	75
9	25	75
10	25	75
11	25	75
12	25	75
13	25	75
14	25	75
15	25	75
16	25	75
17	25	75
18	25	75
19	25	75
20	25	75
21	25	75
22	25	75
23	25	75
24	25	75

500-1-1 (U)
- CLASS B
SY GFD
RIP RAP
ET 2D-2
(TYP)
N N WAREHOUSE

5/14/99	
---------	--

28-4 FOR INTERSECTION SEE SHEET 49 FOR PDE SEE SHEET 56 FOR FUTURE ALIGNMENT SEE SHEET 57 FOR MITIGATION SEE SHEET 61 FOR

SEE NOTE 3

PDE

S

F

TS

E 40

NC 24-27

NORTH CAROLINA VA

0 1 MILE

[illegible][illegible][illegible]

10/15/2018	<p>ROW REV. - 39915 - REMOVED PARCEL 179 AND 171 INTO 170 - JWM</p> <p>ROW REV. - 39915 - REMOVED PARCEL 173A - JWM</p> <p>ROW REV. - 12217 - UPDATED EXIST ROW LINE ALONG PARCEL 169; ADDED PARCEL 173A; COMBINED PARCELS 173 AND 176; AND UPDATED PROPERTY OWNER AND</p>
------------	--

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11

11

11

11

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11

PROJECT REFERENCE NO.	R-25308	SHEET NO.	29
DESIGNER	KIMLEY-HORN	CHECKED BY	HYDRAULICS ENGINEER
DATE	04/11/10	APPROVED BY	
PROJECT LOCATION	421 FAIRVIEW STREET, SUITE 600 RALEIGH, NC 27601		

LEGEND	PERMIT DRAWING SHEET 38 OF 84
REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
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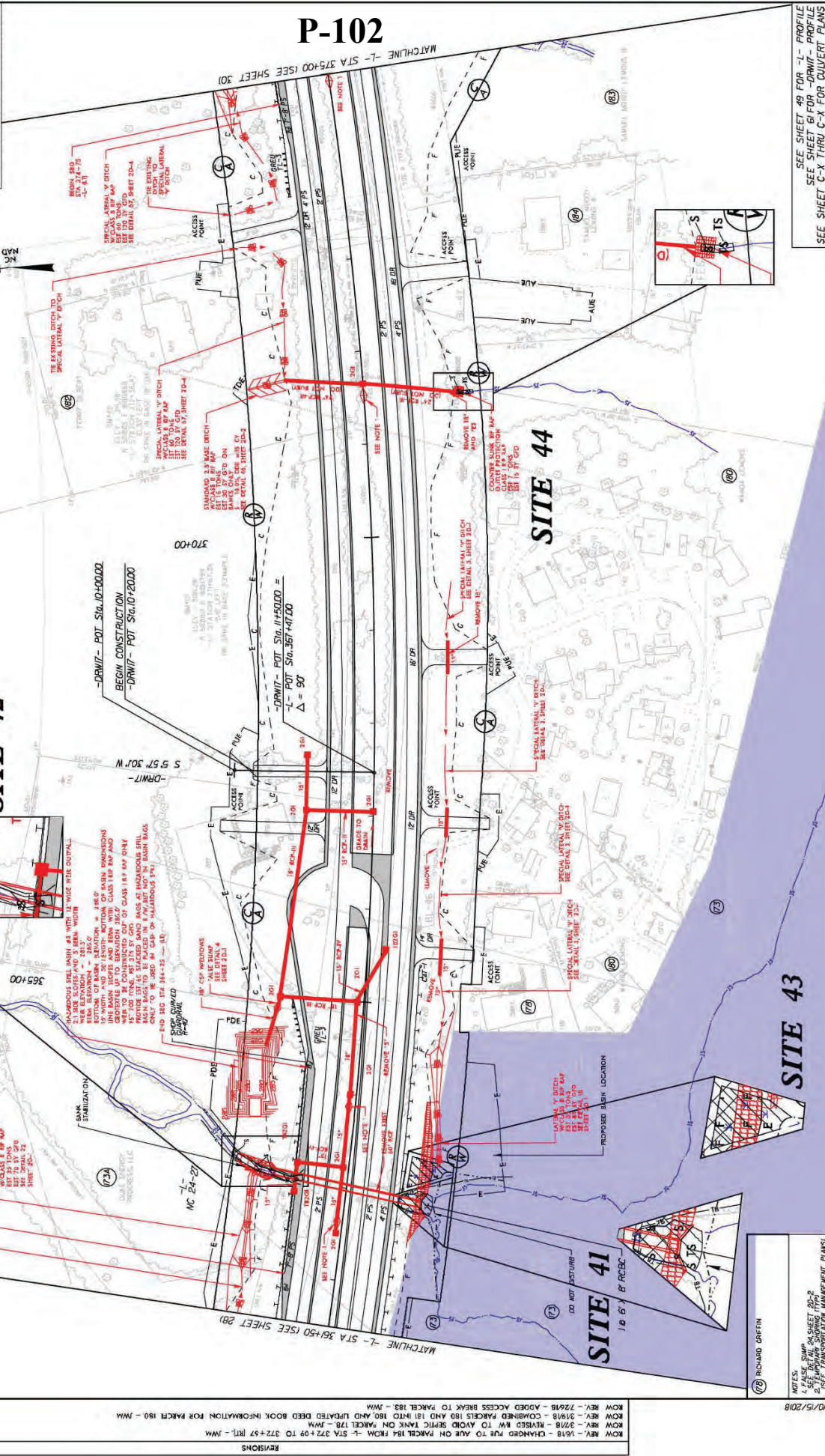
REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED

REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
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REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
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REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
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REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
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REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED

REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED	REMOVES EXISTING IN WHITE AND REMOVES IMPACTS IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED
REMOVES EXISTING IN HATCHED	REMOVES EXISTING IN HATCHED



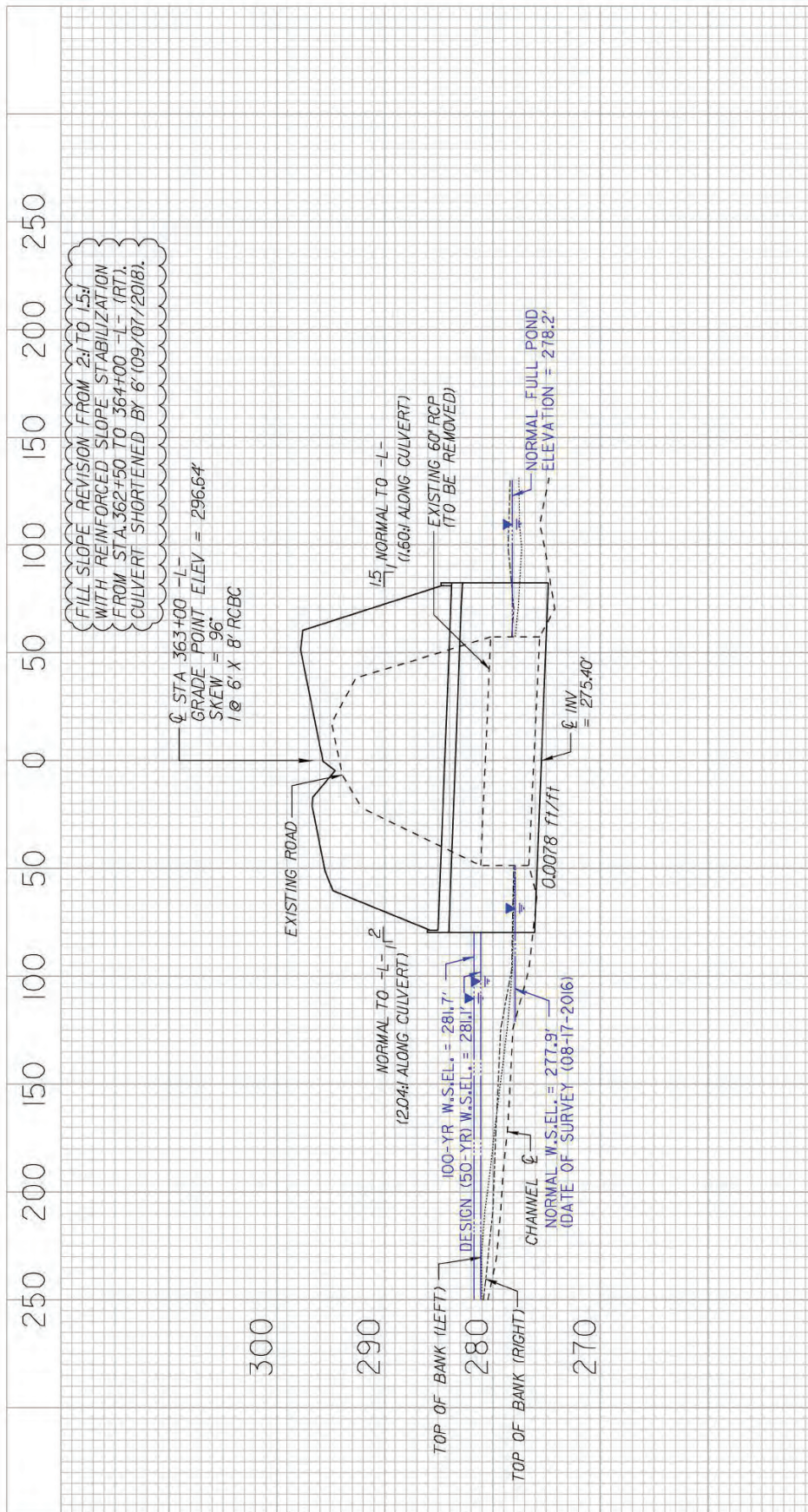
REVISIONS	NOTES
ROW REV. - 10/18 - CHANGED PUE TO AVE ON PARCEL 184 FROM -L- STA 372+09 TO 372+57 (RT) - JMM	1. FALSE SWMP
ROW REV. - 10/18 - CHANGED PUE TO AVE ON PARCEL 184 FROM -L- STA 372+09 TO 372+57 (RT) - JMM	2. FALSE SWMP
ROW REV. - 10/18 - CHANGED PUE TO AVE ON PARCEL 184 FROM -L- STA 372+09 TO 372+57 (RT) - JMM	3. FALSE SWMP
ROW REV. - 10/18 - CHANGED PUE TO AVE ON PARCEL 184 FROM -L- STA 372+09 TO 372+57 (RT) - JMM	4. FALSE SWMP
ROW REV. - 10/18 - CHANGED PUE TO AVE ON PARCEL 184 FROM -L- STA 372+09 TO 372+57 (RT) - JMM	5. FALSE SWMP

10/15/2018

PERMIT DRAWING
 SHEET 60 OF 84

SITE 41 & 42

P-104

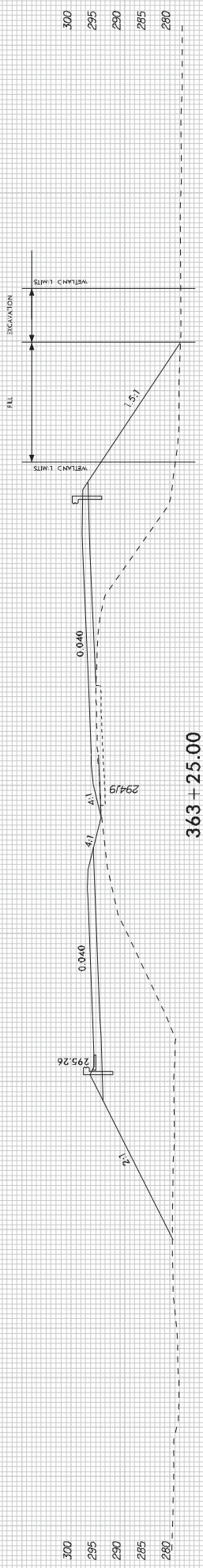


5/14/99

10/15/2018

REVISIONS

SITE 43



P-105

-L- NC 24-27-73

150

140

130

120

110

100

90

80

70

60

50

40

30

20

10

0

10

20

30

40

50

60

70

80

90

100

110

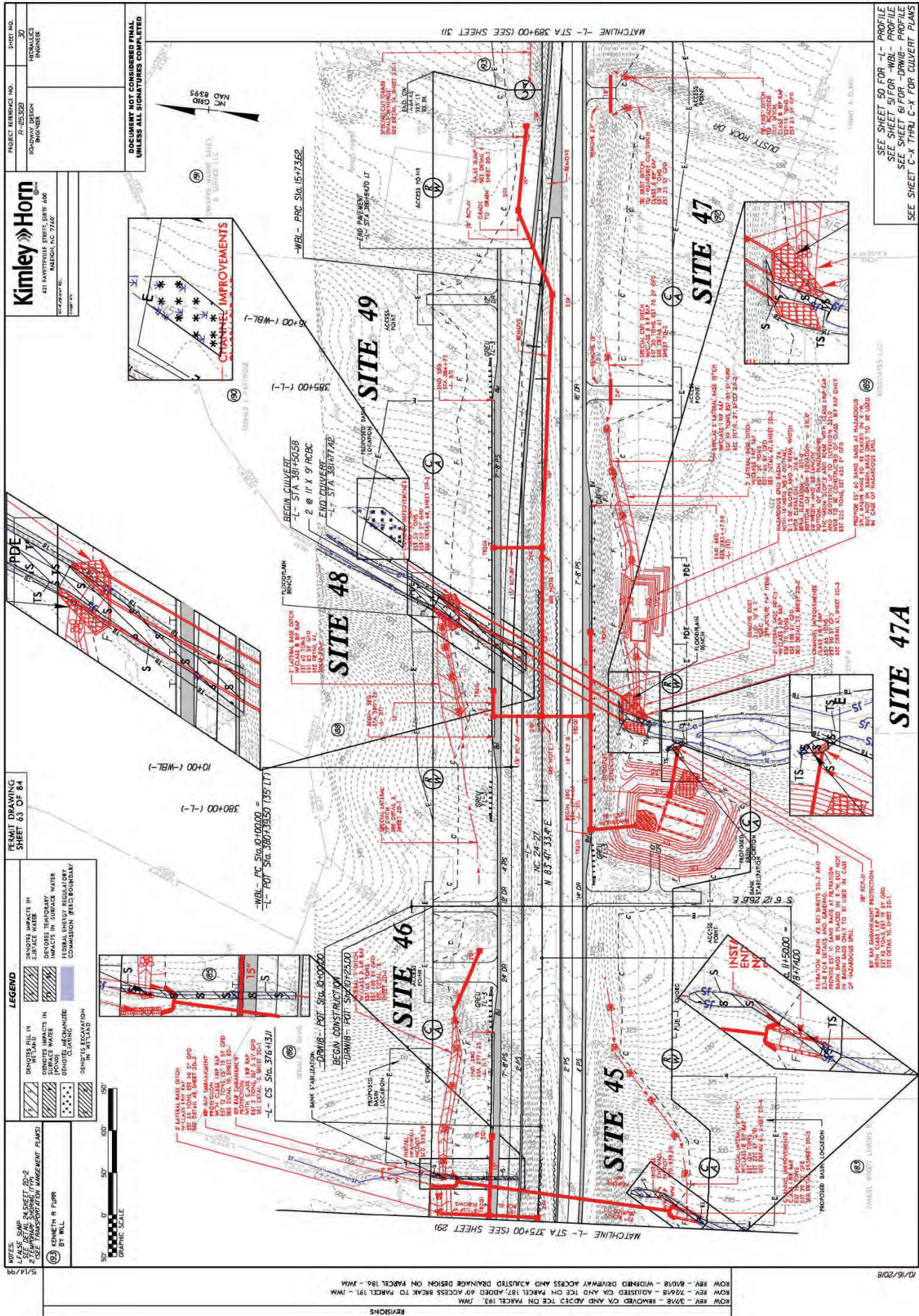
120

130

140

150






SEE SHEET 50 FOR -L- PROFILE
SEE SHEET 51 FOR -WBL- PROFILE
SEE SHEET 52 FOR -DRWB- PROFILE
SEE SHEET C-X THRU C-Y FOR COVERT PLANS

SITE 47A

10/16/2018

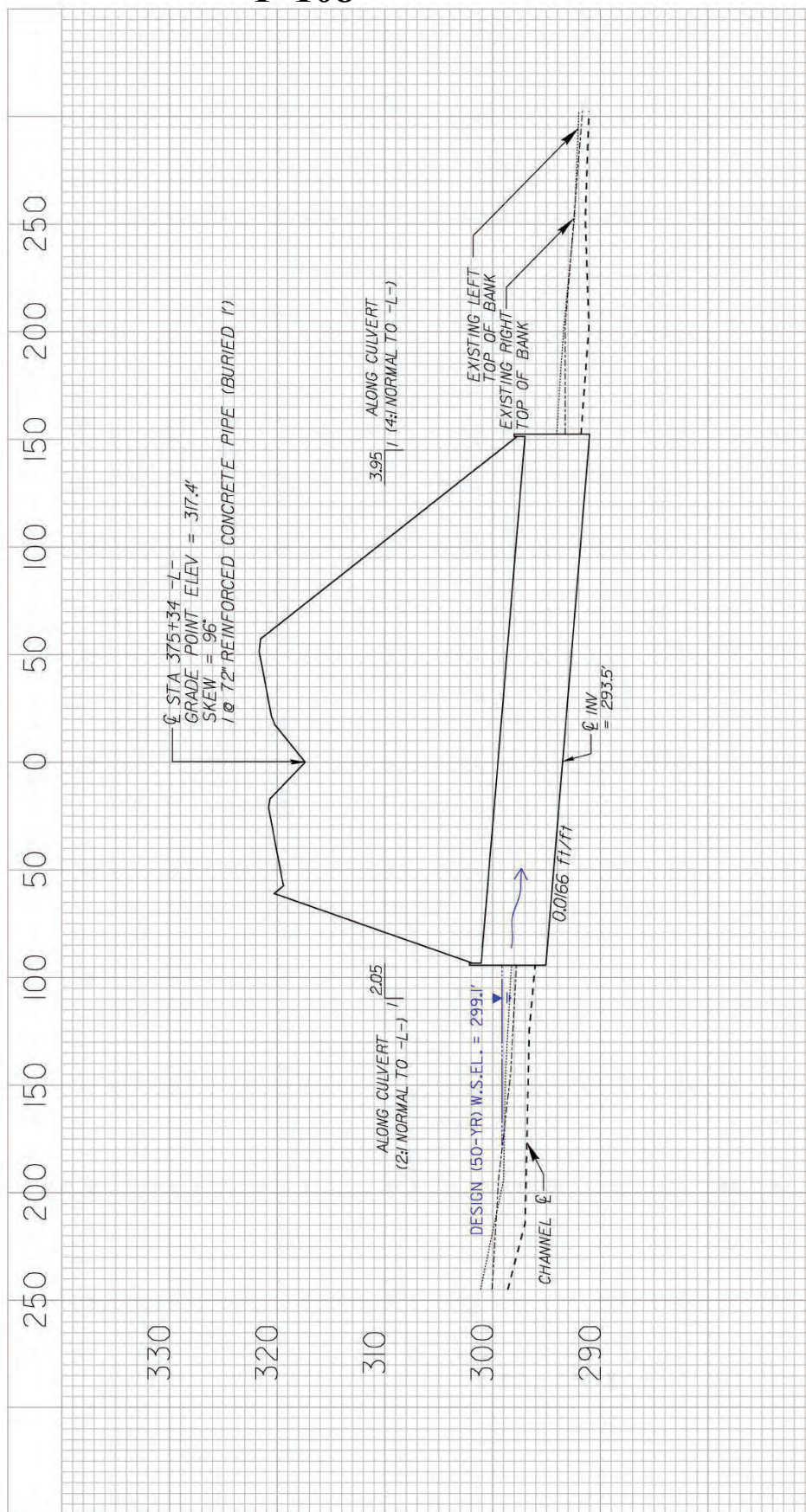
REVISIONS
ROW REV - 3/7/18 - RELOCATED CN AND ADDED TCE ON PARCEL 193. JWM
ROW REV - 7/26/18 - ADJUSTED CA AND TCE ON PARCEL 187, ADDED 40' ACCESS BREAK TO PARCEL 191. JWM
ROW REV - 8/10/18 - WIDENED DRIVEWAY ACCESS AND ADJUSTED DRAINAGE DESIGN ON PARCEL 196. JWM

 P.O. BOX 35068 • RALEIGH, N.C. 27635-0568 TEL: 919/881-1000 FAX: 919/881-1001	PROJECT REFERENCE NO. P-25309	SHEET NO. 54
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

SITE 45 & 46

PERMIT DRAWING
 SHEET 04 OF 54

P-108



5/14/99

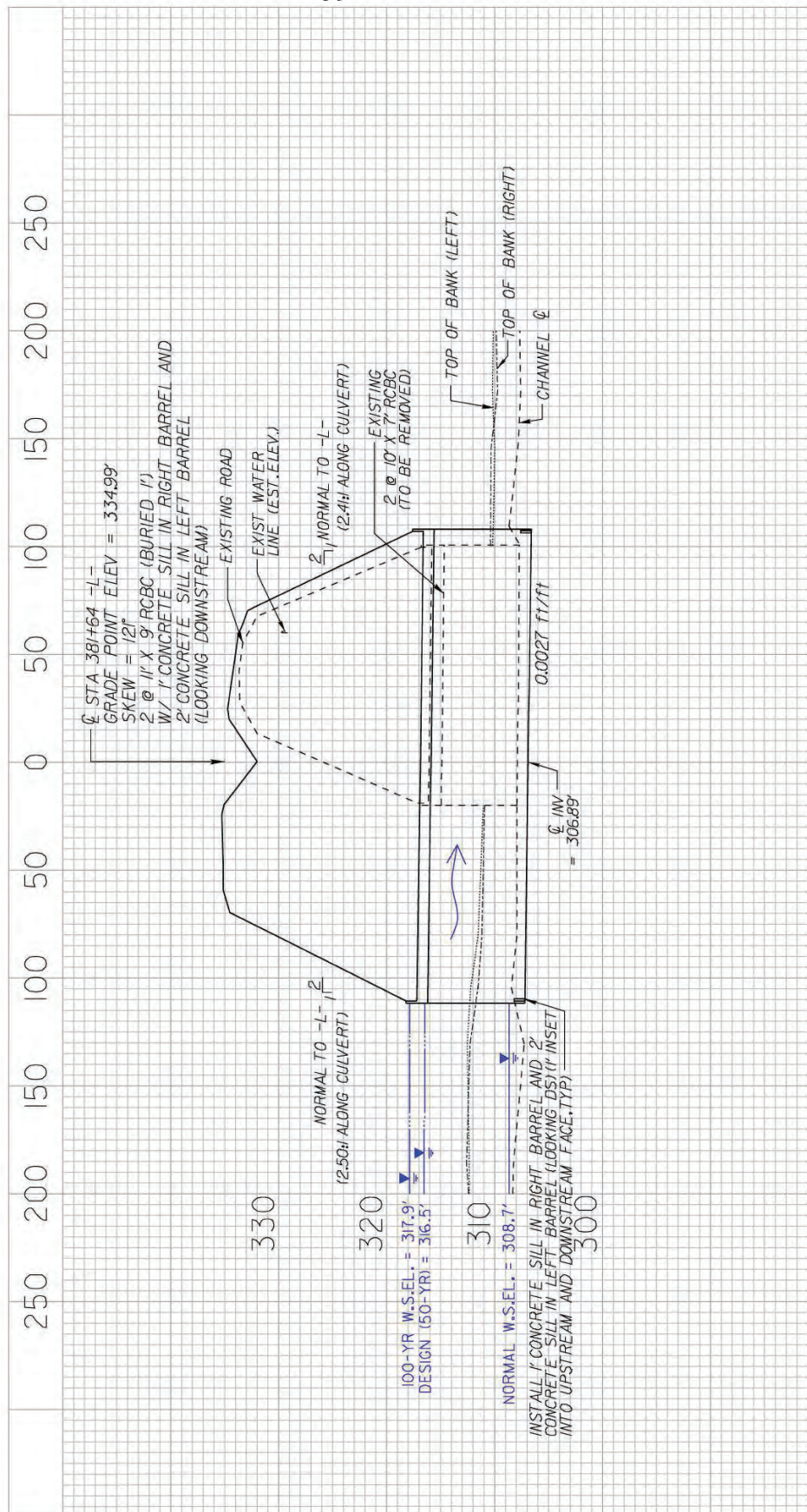
REVISIONS

10/15/2018

SITE 47 & 48

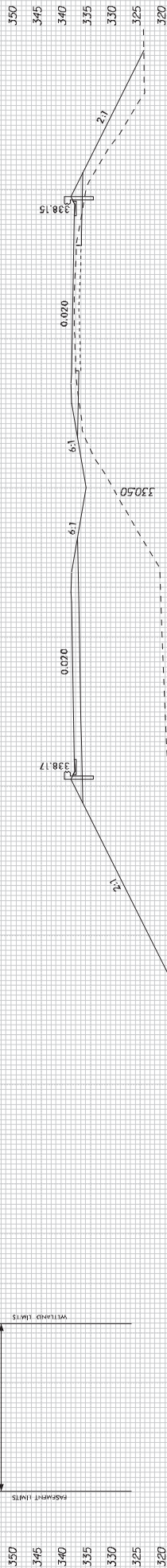
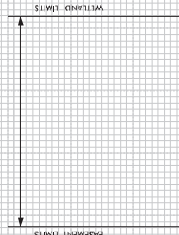
PERMIT DRAWING
 SHEET 05 OF 54

P-109



SITE 49

MECHANIZED CLEARING



383 + 35.00

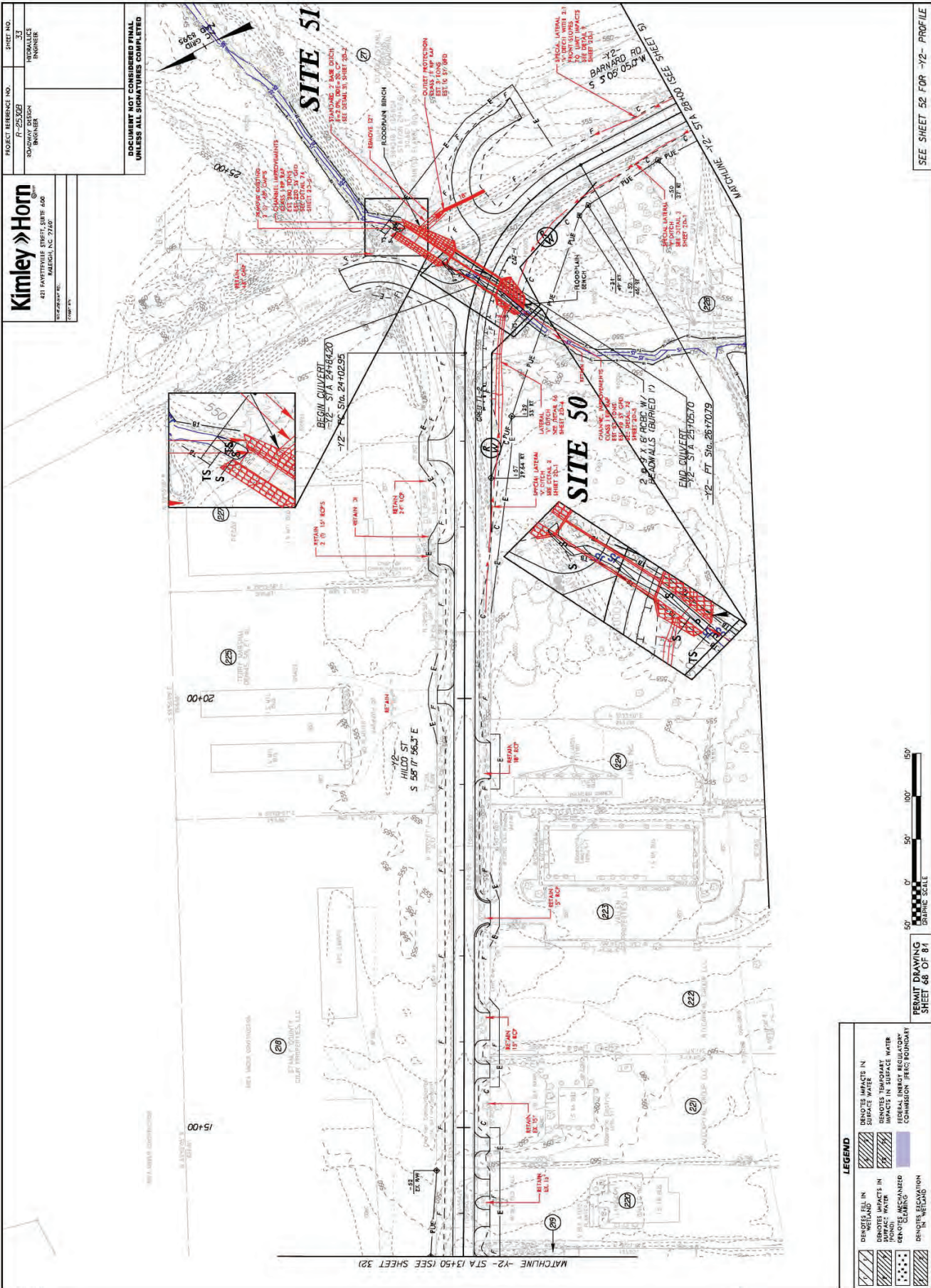
-L- NC 24-27-73

Kimley » Horn 421 FAIVETTE STREET, SUITE 400 RALEIGH, N.C. 77407 <small>US & Foreign Inc.</small> <small>Circle 375</small>		PROJECT REFERENCE NO. <i>R-257028</i>	SHEET NO. <i>33</i>
		KIDWAY DESIGN SERVICES	HYDRAULICS ENGINEER
		DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



421 FAYETTEVILLE STREET, SUITE 600
RALEIGH, NC 27601

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



SEE SHEET 52 FOR -Y2- PROFILE

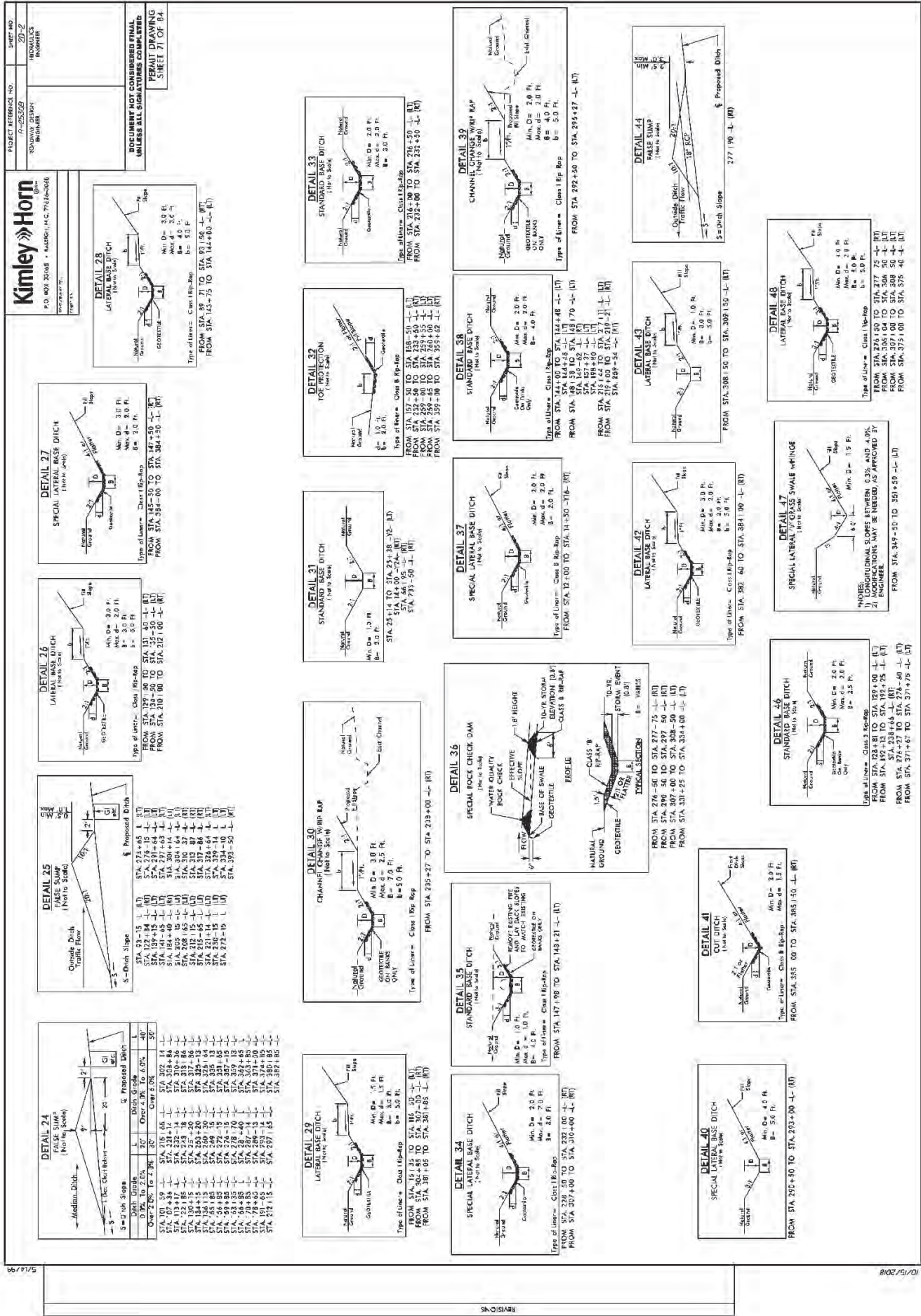
GRAPHIC SCALE

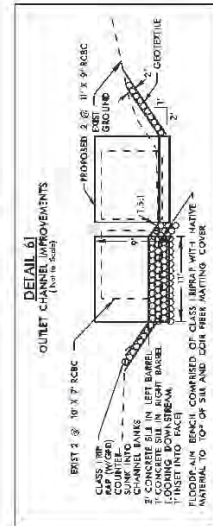
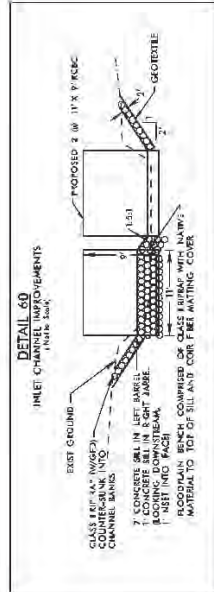
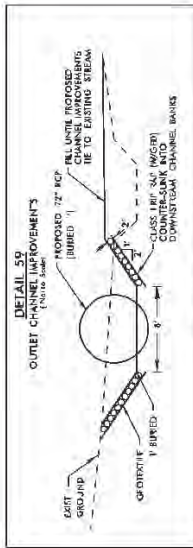
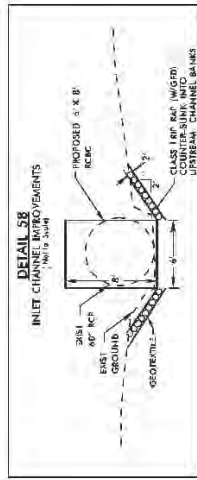
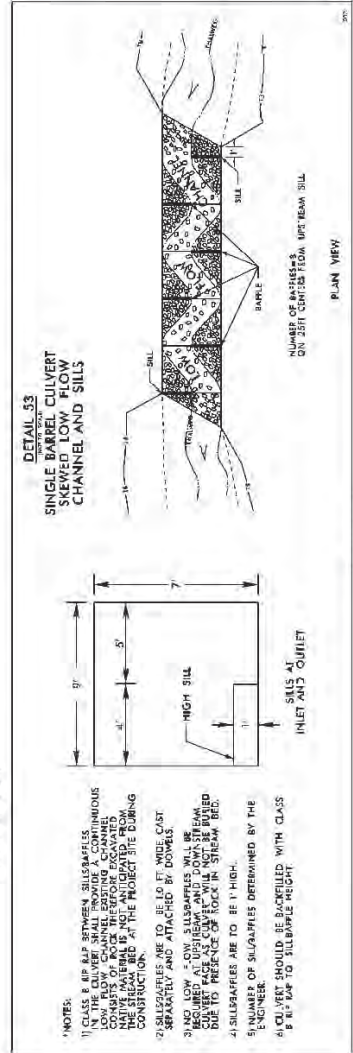
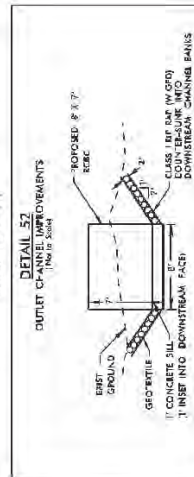
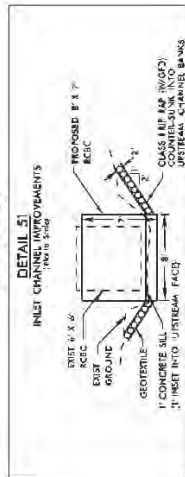
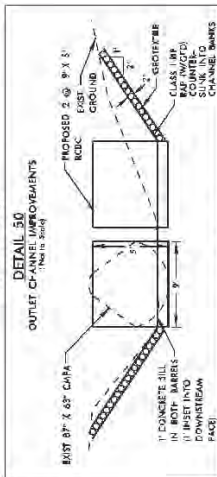
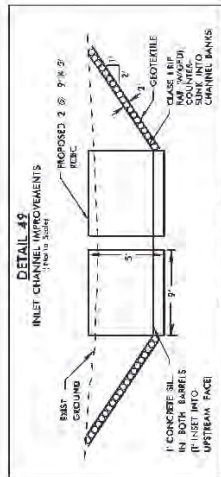
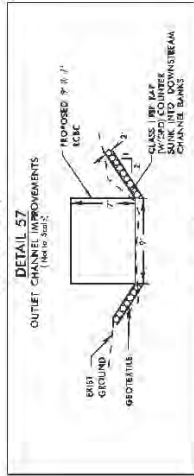
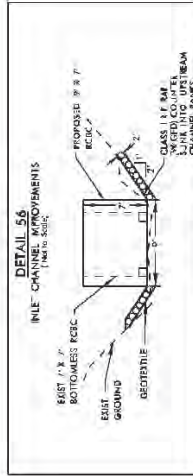
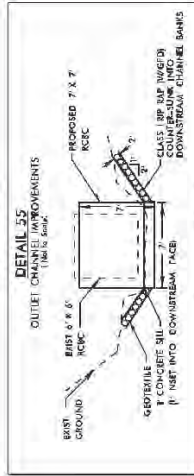
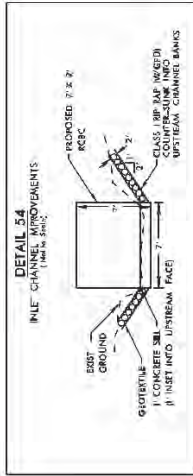
PERMIT DRAWING
SHEET 68 OF 84

LEGEND

	DENOTES FILL IN WETLAND		DENOTES IMPACTS IN SURFACE WATER
	DENOTES IMPACTS IN SURFACE WATER (POND)		DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES MECHANIZED CLEANSING		FEDERAL ENERGY REGULATORY COMMISSION (FERC) BOUNDARY

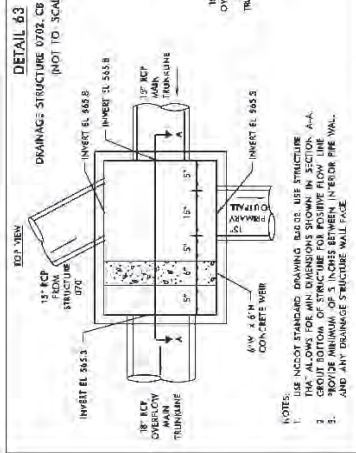
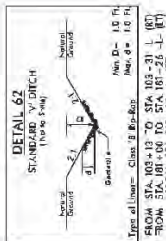
10/15/2018





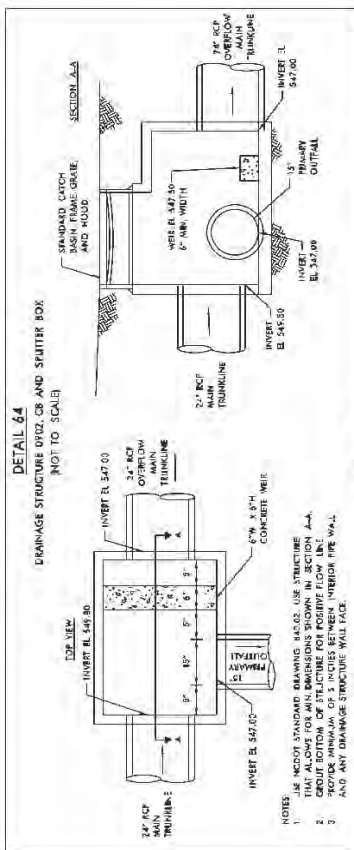
PROJECT REFERENCE NO.		SHEET NO.	
P-25229		20-4	
DESIGNER		HYDRAULICS	
KIMLEY-HORN		HYDRAULICS	
P.O. BOX 35048 • RALEIGH, N.C. 27634-0508		DATE	
10/15/2008		BY	
10/15/2008		CHECKED	
10/15/2008		APPROVED	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED			
PERMIT DRAWING SHEET 73 OF 84			

Kimley-Horn



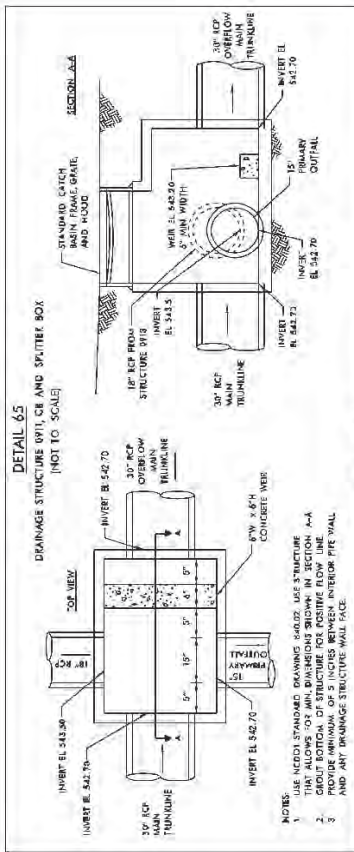
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(NOT TO SCALE)

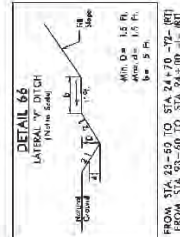


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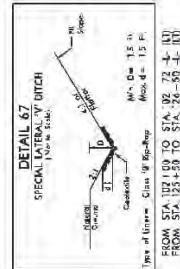
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DRAINAGE STRUCTURE 0701 CB AND SPURTER BOX
(NOT TO SCALE)



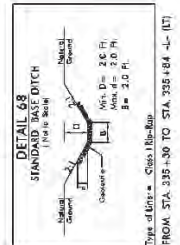
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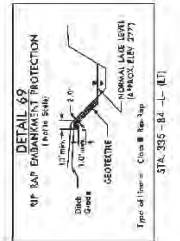
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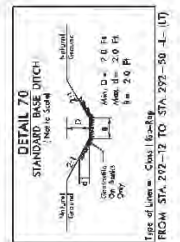
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FROM STA. 591.56 TO STA. 591.56 - 4- (RT)

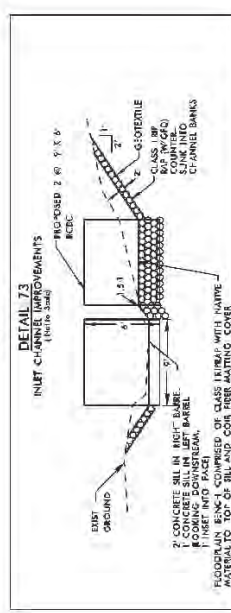
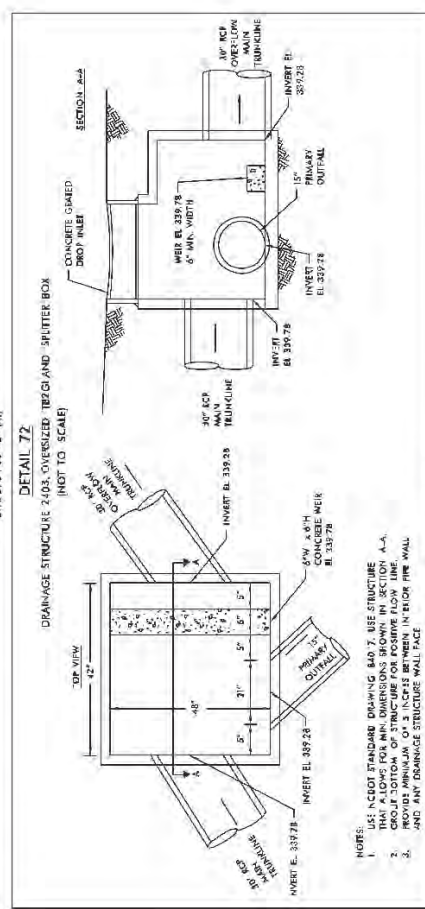
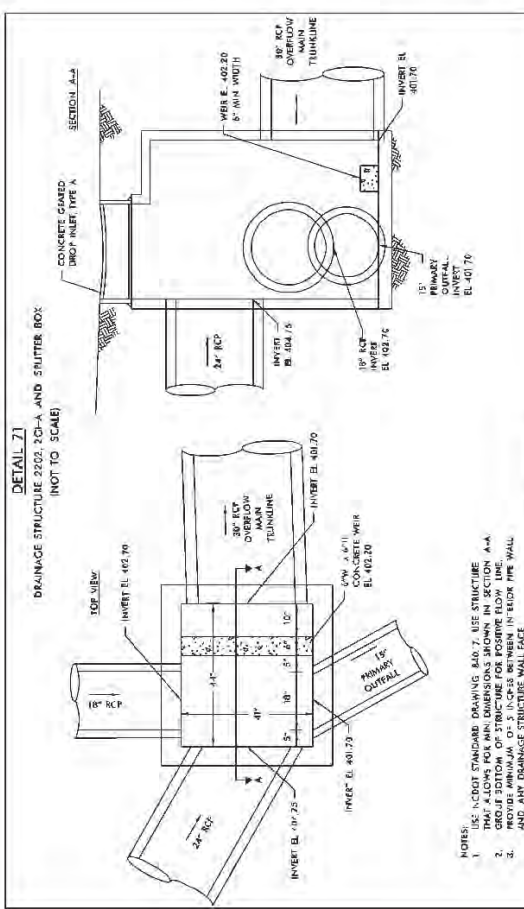
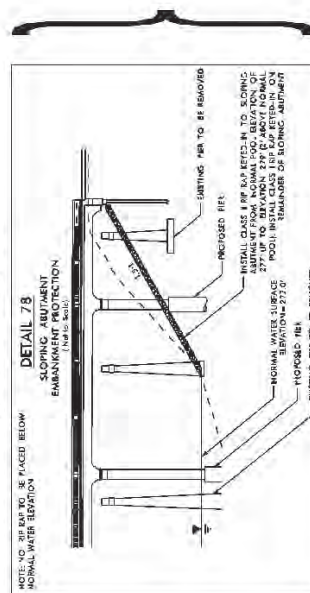
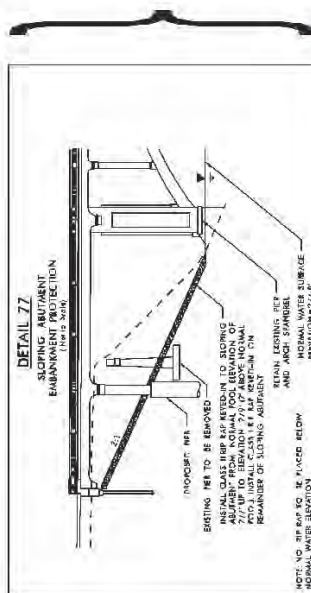
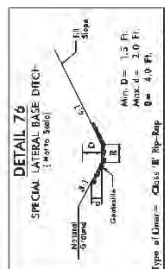
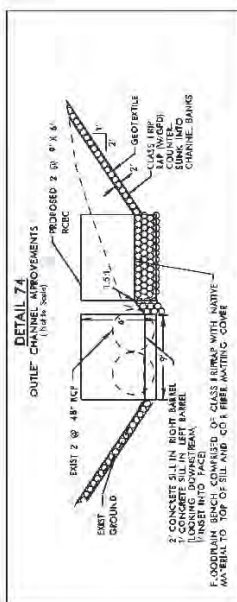


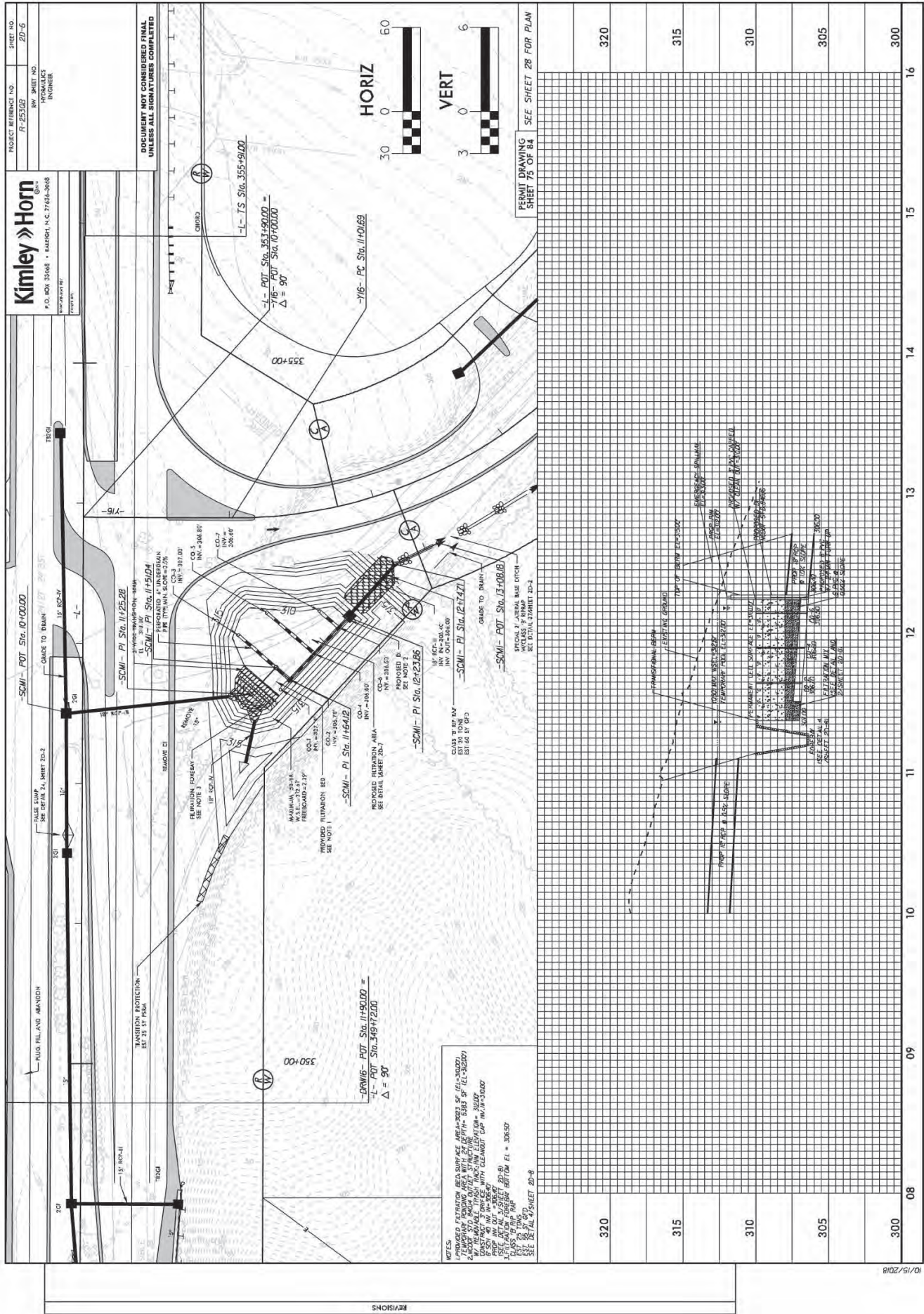
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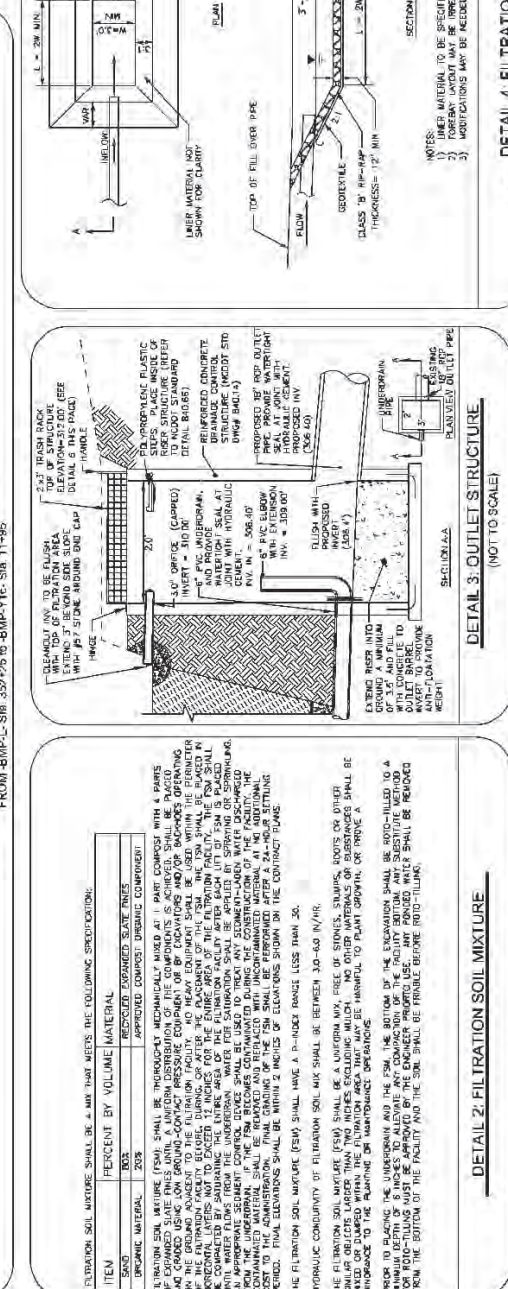
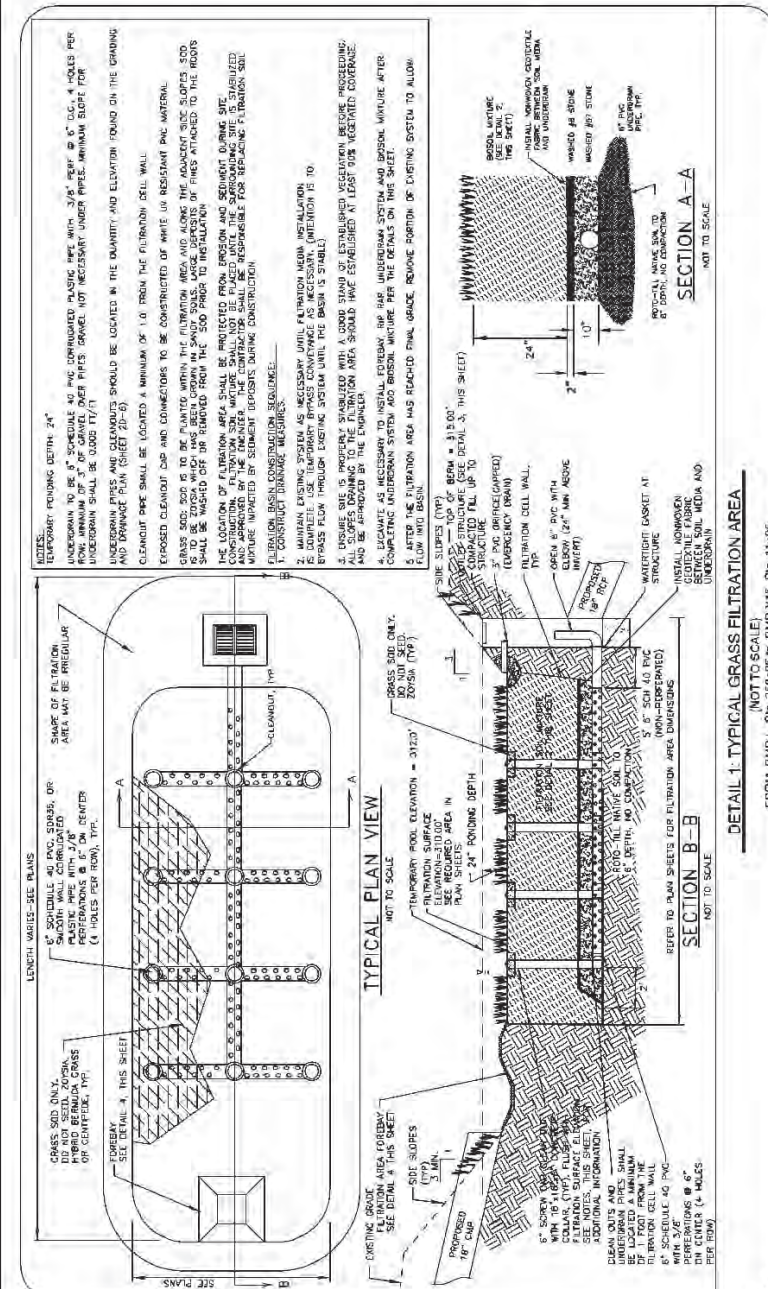


FROM STA. 591.56 TO STA. 591.56 - 4- (RT)

Kimley-Horn
 P.O. BOX 20048 • ALBUQUERQUE, N.M. 87102-0048
 TEL: 505.263.7000 • FAX: 505.263.7001
 WWW.KIMLEY-HORN.COM







WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS						SURFACE WATER IMPACTS			
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	38+70 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	19	9	
2	52+52/52+68 -L- (RT)	Fill						< 0.01	< 0.01	34	7	
2	52+64/52+92 -L- (RT)	1 @ 8' x 7' RCBC						0.01		72		
2	52+68/53+28 -L- (RT)	Lateral Base Ditch						< 0.01	< 0.01	65	10	
3	52+85/53+06 -L- (LT)	Fill						< 0.01		38		
3	53+06/53+45 -L- (LT)	Bank Stabilization						< 0.01		40		
3	53+45/53+67 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	11	14	
3	53+67/53+89 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	10	25	
4	66+88 -L- (RT)	Outlet Protection						< 0.01	< 0.01	5	7	
5	12+34/12+57 -Y6- (RT)	Outlet Protection						< 0.01	< 0.01	16	10	
6	87+75/93+55 -L- (RT)	Fill/Ditch Excavation	0.19		0.15	0.12						
7	93+53 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	26	10	
7	93+60 -L- (RT)	1 @ 7' x 7' RCBC						< 0.01		60		
8	93+61 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	16	10	
9	100+72/100+95 -L- (LT)	Outlet Protection						< 0.01	< 0.01	18	10	
9	100+95/101+95 -L- (LT)	36" RCP and Fill						0.01		109		
TOTALS*:			0.19		0.15	0.12		0.07	0.01	539	112	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-15-2018
STANLY AND MONTGOMERY COUNTIES
R-2530B & B-4974
34446.1.6

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
10	103+40 -L- (RT)	Mechanized Clearing				< 0.01						
11	113+36/113+62 -L- (RT)	Fill/Ditch Excavation						< 0.01		27		
11	115+08/116+10 -L- (RT)	Fill						< 0.01		35		
12	115+24/115+39 -L- (LT)	Outlet Protection						< 0.01	< 0.01	21	10	
12	115+39/116+14 -L- (LT)	Fill / 60" RCP						0.01		126		
13	116+16 -L- (RT)	Fill / 60" RCP						< 0.01	< 0.01	23	10	
14	116+84/118+60 -L- (RT)	Fill	0.09			0.09						
15	118+96/120+93 -L- (RT)	Fill	0.05			0.02						
15	121+18/121+67 -L- (RT)	Erosion Control Basin	< 0.01		< 0.01	< 0.01						
16	126+81/131+74 -L- (LT)	Fill/Ditch Excavation						0.04	< 0.01	368	10	
17	134+35/134+87 -L- (LT)	Lateral Base Ditch						< 0.01	< 0.01	45	10	
17	134+87/144+06 -L- (LT)	Fill						0.09		947		
17	144+06/144+68 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	55	25	
18	147+91/148+73 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	21	34	
18	148+73/149+50 -L- (LT)	42" RCP and Fill						0.01		130		
TOTALS*			0.15		< 0.01	0.12		0.17	< 0.01	1798	99	0

*Rounded totals are sum of actual impacts

NOTES:

Permit Site 11 - POND A is a total take: 0.20 ac
Permit Site 16 - POND B is a total take: 0.23 ac

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-15-2018
STANLY AND MONTGOMERY COUNTIES
R-2530B & B-4974
34446.16
80 OF 84

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
19	149+52/149+63 -L- (RT)	Fill						< 0.01		20		
19	149+59/149+69 -L- (RT)	Standard Base Ditch						< 0.01	< 0.01	24	12	
19	149+63 -L- (RT)	Mechanized Clearing				< 0.01						
20	157+10/157+46 -L- (LT)	Fill						0.01		116		
20	157+37 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	15	12	
21	180+34/180+73 -L- (RT)	Fill	0.02				< 0.01					
22	191+57/192+12 -L- (LT)	Fill						< 0.01		59		
22	192+12/192+31 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	11	10	
23	208+74/211+68 -L- (RT)	Fill						0.03		333		
23	211+68/212+09 -L- (RT)	Lateral Base Ditch						< 0.01	< 0.01	38	10	
24	216+31/217+11 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	86	12	
24	217+11/217+17 -L- (LT)	Fill						< 0.01		10		
25	217+82/218+73 -L- (RT)	Fill						0.01		136		
25	218+73/219+22 -L- (RT)	Standard Base Ditch						< 0.01	< 0.01	73	10	
26	232+30/232+68 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	20	20	
27	233+34/233+64 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	10	20	
TOTALS*:			0.02			< 0.01	< 0.01	0.09	0.01	951	106	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-15-2018
STANLY AND MONTGOMERY COUNTIES
R-2530B & B-4974
34446.1.6
SHEET 81 OF 84

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
28	235+16/238+03 -L- (RT)	Lateral Base Ditch						< 0.01	< 0.01	52	20	
28	235+47/237+70 -L- (RT)	Fill						0.04		310		
29	236+89/237+10 -L- (LT)	Fill						< 0.01	< 0.01	16	10	
30	238+51/238+77 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	10	16	
31	259+57 -L- (LT)	Fill						0.01	< 0.01	107	10	
32	276+19/276+66 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	66	10	
32	276+66/277+16 -L- (LT)	Fill						< 0.01		98		
33	277+19/278+21 -L- (RT)	Fill						0.01		118		
33	278+21/278+37 -L- (RT)	Outlet Protection						< 0.01	< 0.01	25	13	
34	292+05/292+77 -L- (LT)	Standard Base Ditch						< 0.01	< 0.01	75	25	
34	292+77/296+87 -L- (LT)	Fill						0.02		178		
35	297+72/298+00 -L- (RT)	Fill						< 0.01		35		
35	298+00/298+26 -L- (RT)	Outlet Protection						< 0.01	< 0.01	11	10	
36	304+54/304+66 -L- (RT)	Bank Stabilization						< 0.01		17		
36	304+66/304+81 -L- (RT)	1 @ 9' x 7' RCBC						< 0.01		23		
TOTALS*								0.12	0.01	1141	114	0

*Rounded totals are sum of actual impacts

NOTES:

Permit Site 34 - POND D is a total take: 0.22 ac

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-15-2018
STANLY AND MONTGOMERY COUNTIES
R-2530B & B-4974
34446.1.6
SHEET 82 OF 84

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
37	305+21/305+95 -L- (LT)	1 @ 9' x 7' RCBC Bank Stabilization						0.02		136		
37	305+95/306+06 -L- (LT)							< 0.01	< 0.01	27	10	
38	335+75/336+40 -L-	Sloping Abutment and Bank Stabilization and Temp. Bridge						0.05	0.02	238	18	
39	345+69/346+12 -L-	Sloping Abutment and Bank Stabilization and Causeway						0.04	0.02	171	20	
40	359+25/359+62 -L- (RT)	36" RCP and fill						0.01		89		
40	359+62/359+72 -L- (RT)	Outlet Protection						< 0.01	< 0.01	10	11	
41	362+75/363+05 -L- (RT)	1 @ 6' x 8' RCBC						0.01	< 0.01	24	12	
42	363+00/363+07 -L- (LT)	1 @ 6' x 8' RCBC						< 0.01		32		
42	363+07/363+21 -L- (LT)	Bank Stabilization						< 0.01	< 0.01	44	7	
43	363+07/363+41 -L- (RT)	Fill/Ditch Excavation	0.02		< 0.01							
44	371+48 -L- (RT)	Outlet Protection						< 0.01	< 0.01	7	10	
45	375+05/375+43 -L- (RT)	72" RCP and Fill						0.01	< 0.01	86	11	
TOTALS*:			0.02		< 0.01			0.16	0.06	864	99	0

*Rounded totals are sum of actual impacts

NOTES:
 Total Temporary Pier Impacts for Bridge No. 50 = 0.045 AC (2000 Sq. Ft.)
 Total Temporary Pier Impacts for Bridge No. 51 = 0.04 AC (1880 Sq. Ft.)
 Total Permanent Pier Impacts for Bridge No. 51 = 0.001 AC (60 Sq. Ft.)

NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 10-15-2018
 STANLY AND MONTGOMERY COUNTIES
 R-2530B & B-4974
 34446.1.6
 SHEET 83 OF 84

WETLAND AND SURFACE WATER IMPACTS SUMMARY												
			WETLAND IMPACTS				SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
46	375+49 -L- (LT)	72" RCP and Fill						< 0.01		75		
46	375+51 -L- (LT)	Bank Stabilization						< 0.01		26		
47A	380+64 -L- (RT)	Bank Stabilization						< 0.01	< 0.01	10	16	
47	380+82/381+00 -L- (RT)	2 @ 11' x 9' RCBC						< 0.01		4		
47	381+00/381+19 -L- (RT)	Floodplain Bench						< 0.01	< 0.01	25	10	
48	381+54/382+18 -L- (LT)	2 @ 11' x 9' RCBC						0.03		94		
48	382+18/382+46 -L- (LT)	Floodplain Bench						< 0.01	0.01	31	33	
49	383+00/383+47 -L- (LT)	Mechanized Clearing				0.03						
50	24+59/24+84 -Y2- (RT)	Floodplain Bench						< 0.01	< 0.01	35	10	
50	24+84/24+94 -Y2-	2 @ 9' x 6' RCBC						< 0.01		74		
51	25+09 -Y2- (LT)	Floodplain Bench						< 0.01	< 0.01	8	12	
TOTALS*:						0.03		0.06	0.02	382	81	0
PROJECT TOTALS*:			0.38		0.15	0.27		0.67	0.11	5675	611	0

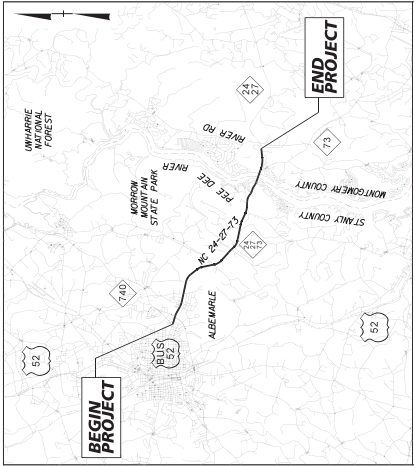
*Rounded totals are sum of actual impacts

NOTES:

R-2530B/B-4974 - Total Pond Impacts: 0.75 ac

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-15-2018
STANLY AND MONTGOMERY COUNTIES
R-2530B & B-4974
34446.1.6
T 84 OF 84

TIP PROJECT: R-2530B/B-4974



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

NEU PERMIT PLANS STANLY & MONTGOMERY COUNTIES

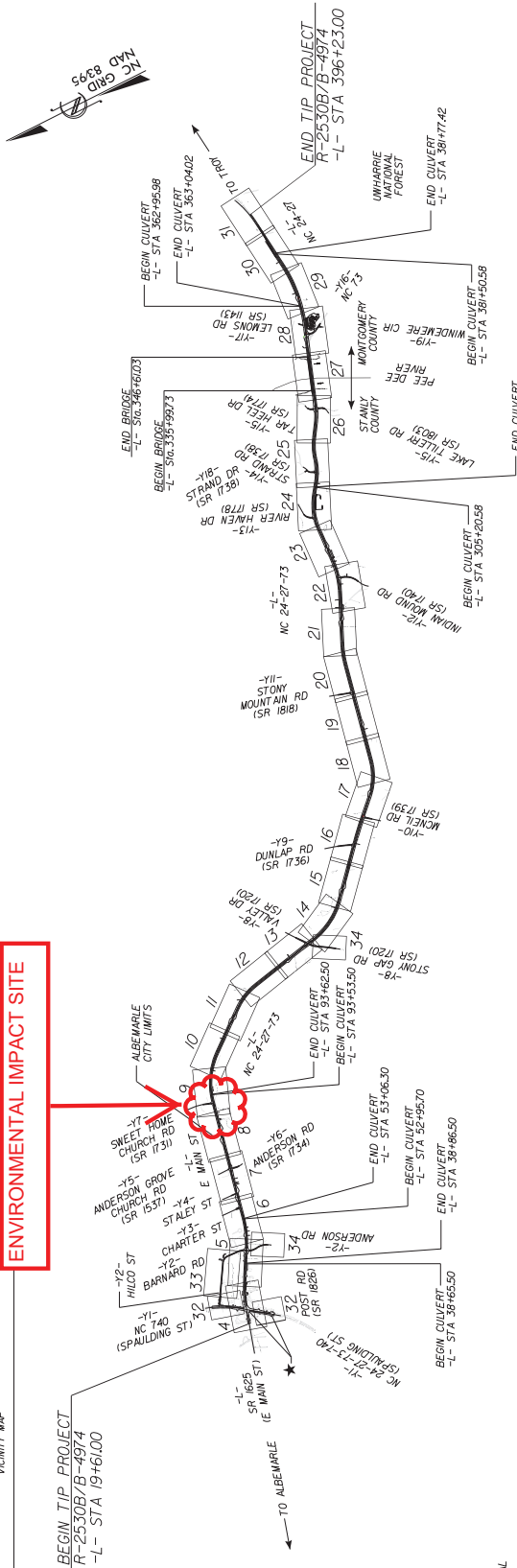
T.I.P. NO.	R-2530BB-4974
SHEET NO.	UE-1

NOTE:
ALL UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS.
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

Environmental Impacts - Utilities

LOCATION: NC 24-27 FROM NC 740 IN ALBEMARLE TO EAST OF THE PEE DEE RIVER
TYPE OF WORK: POWER DISTRIBUTION, COMMUNICATIONS AND GAS RELOCATION

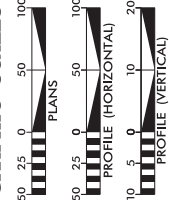
ENVIRONMENTAL IMPACT SITE



★ TRAFFIC SIGNAL

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF ALBEMARLE

GRAPHIC SCALES



INDEX OF SHEETS

SHEET NO.:	DESCRIPTION:
UE-1	TITLE SHEET
UE-6 THRU UE-7	UE PLAN SHEETS

UTILITY OWNERS WITH CONFLICTS

- (A) POWER DISTRIBUTION - CITY OF ALBEMARLE
- (B) WATER, SEWER - CITY OF ALBEMARLE

PREPARED IN THE OFFICE OF:

Michael Baker INTERNATIONAL
Michael Baker Engineering, Inc.
8000 Regency Parkway, Suite 600
Cary, NC 27518
919-453-5488

PROJECT UTILITY COORDINATOR
PROJECT UTILITY TECHNICIAN

Daniel Oliver
Christina Newsome



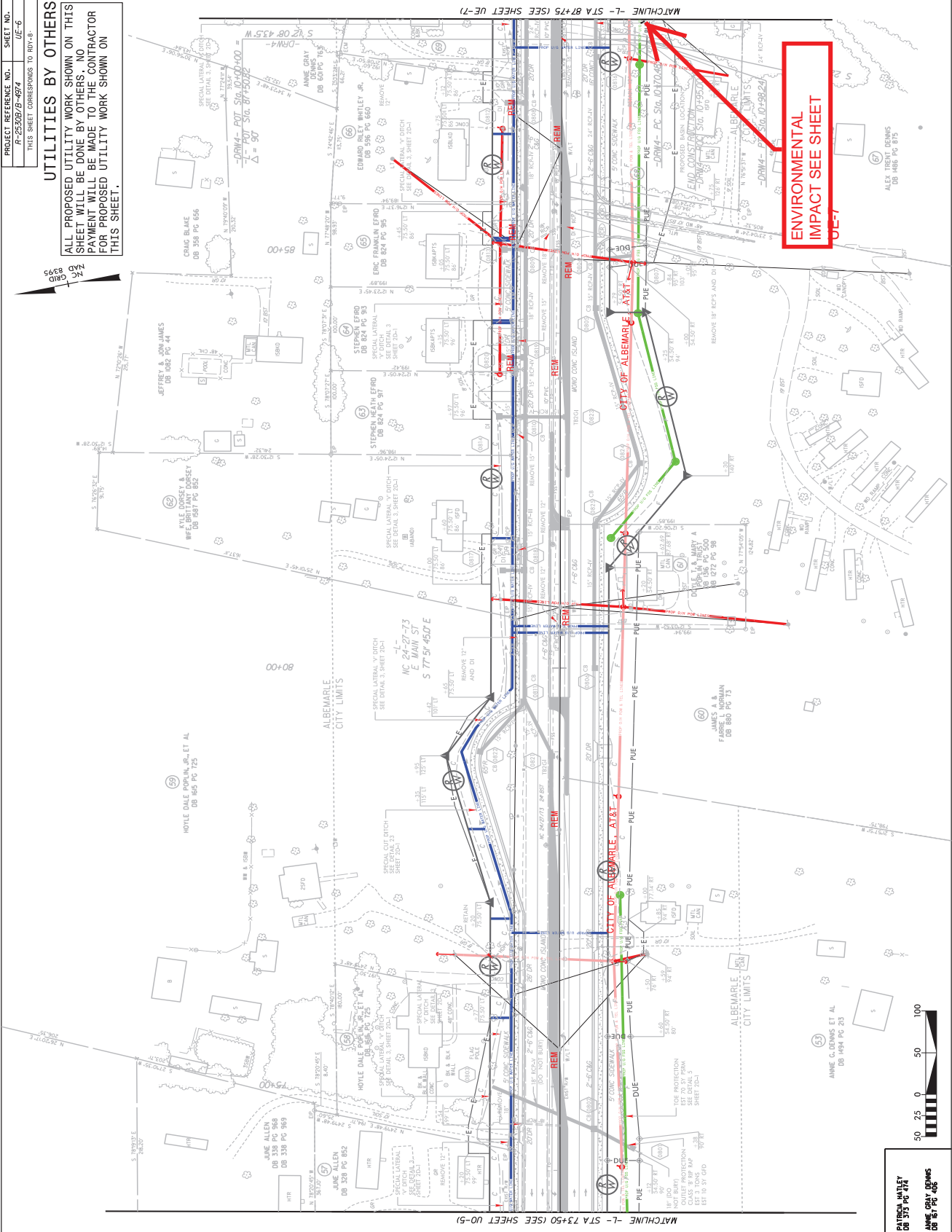
DIVISION OF HIGHWAYS
UTILITIES UNIT
1000 SOUTH CENTER
RALEIGH, NC 27601-1555
PHONE (919) 286-4200
FAX (919) 286-4211

UTILITIES REGIONAL ENGINEER
UTILITIES ENGINEER
UTILITIES AREA COORDINATOR
UTILITIES COORDINATOR

Michael Bright
Donald Hampton
Amy Dugree
Steve Traylor

PROJECT REFERENCE NO. SHEET NO.
R-25302/B-494 UE-6
THIS SHEET CORRESPONDS TO ROW-9.

UTILITIES BY OTHERS
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR PROPOSED UTILITY WORK SHOWN ON THIS SHEET.



**ENVIRONMENTAL
IMPACT SEE SHEET
UE-7**

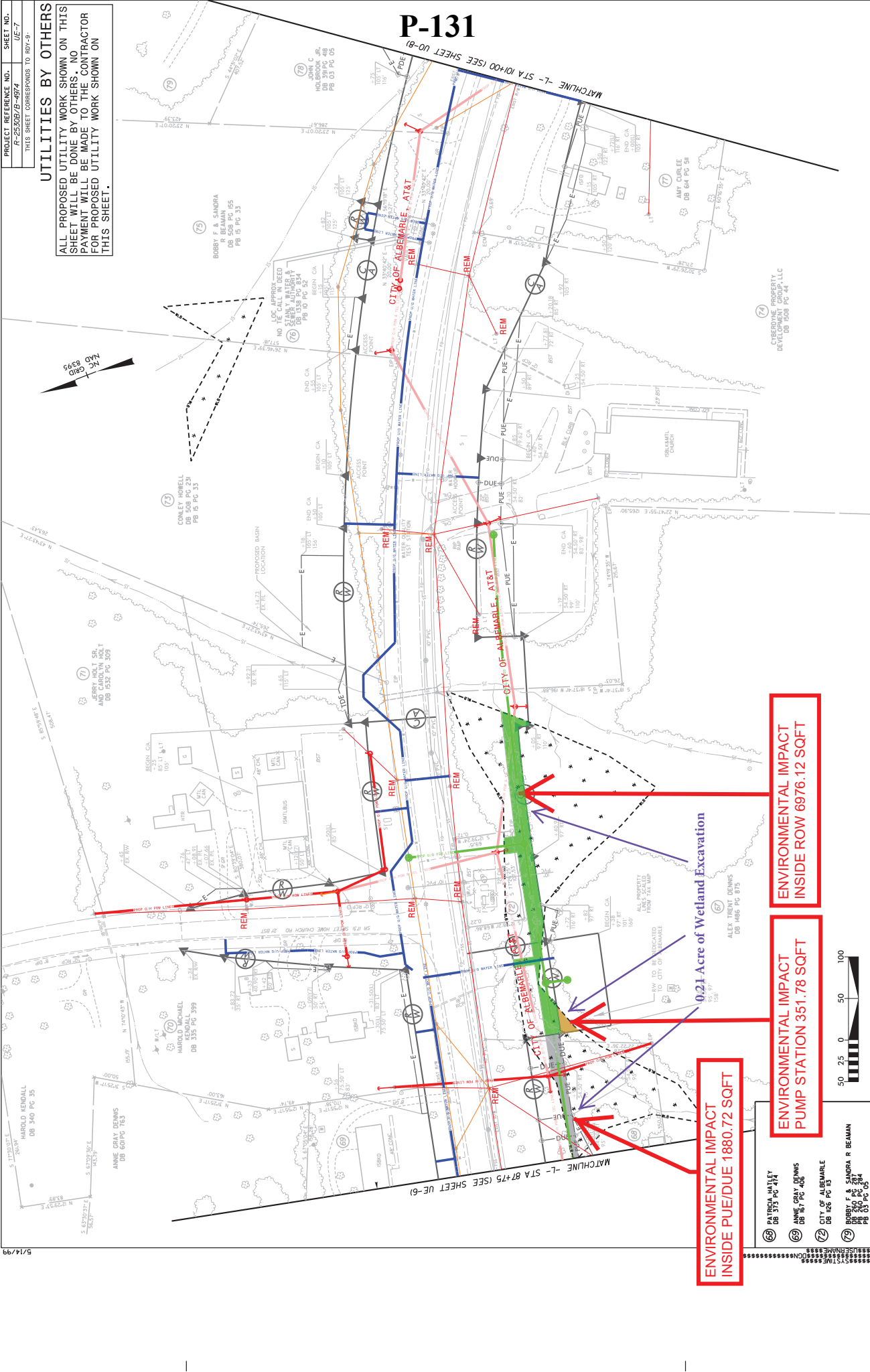


ANNE G. DENNIS ET AL
DB 1494 PG 23
ANNE GRAY DENNIS
DB 87 PG 406

5/14/99

UTILITIES BY OTHERS
 ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS. NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR PROPOSED UTILITY WORK SHOWN ON THIS SHEET.

P-131



Prepared By: Karol P. Mack, Deputy General Counsel, Duke Energy

Return To: Duke Energy

c/o Bambi M. Lohr (DEC45A)

550 South Tryon Street

Charlotte, N.C. 28202

Site: 104543

Land Unit: 1183915

Project No.: 104543-462173

STATE OF NORTH CAROLINA

STANLY COUNTY

MONTGOMERY COUNTY

**PERMIT FOR BRIDGE AND CULVERT
REPLACEMENT AND MAINTENANCE**

**REPLACEMENT AND MAINTENANCE OF EXISTING BRIDGE NOS. 50 AND 51 INCLUDING
CULVERT WITHIN**

YADKIN-PEE DEE PROJECT (FERC P-2206)

THIS BRIDGE AND CULVERT PERMIT (this "Permit") is made and entered into as of the 12 day of July, 2019, by and between **DUKE ENERGY PROGRESS, LLC**, a North Carolina limited liability company ("Duke Energy"), party of the first part, and the **DEPARTMENT OF TRANSPORTATION**, an agency of the State of North Carolina ("Permittee"), party of the second part;

W I T N E S S E T H:

WHEREAS, Permittee owns, leases or otherwise controls substantial equity interests in lands in Stanly County and Montgomery County, North Carolina, adjacent to Lake Tillery which is part of Duke Energy's Yadkin-Pee Dee Project (FERC No. 2206) (the "Project") which Project is subject to the regulatory oversight of, and is operated pursuant to a license issued by, the Federal Energy Regulatory Commission ("FERC"); and

WHEREAS, Permittee desires to use a portion of Project lands for the purpose of performing certain rehabilitation work on Bridge Nos. 50 and 51 including culvert located on NC Highway 24/27 over Lake Tillery on the Yadkin-Pee Dee River; and

WHEREAS, Duke Energy desires to accommodate Permittee's request while at the same time not interfere with Duke Energy's ability to operate and maintain the Project in accordance with its license and other FERC and agency requirements; and

WHEREAS, Article 413 of the FERC license for the Project allows the licensee of the Project to convey easements or rights-of-way across, or leases of, Project lands for replacement, expansion, realignment, or maintenance of bridges and roads for which all necessary state and federal approvals have been obtained without prior FERC approval; and

WHEREAS, Permittee has obtained all necessary state and federal approvals for the replacement, expansion, realignment, or maintenance of the existing Bridge Nos. 50 and 51 including culvert on NC Highway 24/27; and

NOW, THEREFORE, upon the terms and conditions hereafter set out, the covenants and agreements hereafter expressed to be kept and performed by Permittee, and in consideration of the sum of Ten Dollars (\$10.00) and other good and valuable considerations to Duke Energy paid, the receipt of which is hereby acknowledged, and the covenants and agreements hereafter expressed to be kept and performed by Permittee, Duke Energy has bargained and sold, and by these presents does hereby bargain, sell, grant and convey to said Permittee, its successors and assigns, a perpetual permit over the "Permit Area" more particularly described as follows:

Being that portion of Project lands containing a total of 2.5 ± total acres (comprised of 2.0 ± acres as shown and designated on the map labeled "Permit Drawing Sheet 54 of 84" and 0.5 ± acres as shown on the map labeled "Permit Drawing Sheet 58 of 84") attached hereto as **Exhibit A** and made a part hereof.

TERMS AND CONDITIONS:

1. **Term:** This Permit begins on the date hereof and runs in perpetuity; provided, however, Duke Energy may terminate this Permit as provided herein or require its modification at any time if directed to do so by FERC or its successor agency.
2. **Improvements:** Within the Permit Area, Permittee shall have authority to perform bridge rehabilitation work including the following: Bridge No. 50 – minor deck rehabilitation, deck resurfacing, and bent rehabilitation; Bridge No. 51 - replacement and widening of the deck slab and removal and replacement of bents, installation of rip rap on the east and west banks for stabilization, construction of a temporary work bridge on the west bank to be used for loading and off-loading material from barges; construction of a temporary rock causeway from the east bank for pier demolition and installation, and extension of a culvert and outlet structure within the 0.5 ± acre portion of the Permit Area. Permittee agrees that it will obtain additional written approval from Duke Energy before initiating any additional construction, replacement or major repair within the Permit Area that is not specified in this Section 2. Permittee also agrees to advise any other party that it may become aware of who desires to place improvements within the Permit Area that said party must first obtain written approval from Duke Energy.
3. **Maintenance:** Permittee recognizes that it has the continuing responsibility to ensure that the replaced, upgraded, and paved bridge facilities are maintained in good repair, including but not limited to maintenance of the subject bridges, approaches, embankments, guardrails, drainage, erosion control, and any required navigation safety devices within the Permit Area, and agrees to take all reasonable steps necessary to meet this responsibility. Permittee shall maintain all structures within the Permit Area in a safe and sound condition and in a neat appearance and pay all costs for said maintenance.

4. Protection of Environment: Permittee shall take all necessary precautions during the replacement, upgrade and paving construction and subsequent operation and maintenance of Bridge Nos. 50 and 51 on NC Highway 24/27 to protect and enhance the scenic, environmental and recreational values of any affected lands and waters of FERC Project 2206.

5. Access: It is understood by and between Duke Energy and Permittee that Permittee shall have such right of ingress, egress and regress over and upon lands of Duke Energy adjacent to or in the vicinity of the Permit Area as may be essential to the use thereof for the permitted improvements and maintenance of Bridge Nos. 50 and 51 on NC Highway 24/27.

6. Compliance with State, Federal and Local Laws: Permittee agrees that its use of the Permit Area above described, will be consistent with all FERC orders and regulations regarding recreational opportunities and development at licensed projects, and all other applicable state, federal and local laws as well as all ordinances, rules, regulations and sanctions of any regulatory body or governmental agency (state, federal or local) having jurisdiction in the Permit Area, and Permittee's use of the aforesaid Permit Area will comply with all applicable Duke Energy Shoreline Management Guidelines and will not endanger health or safety, create a nuisance or otherwise be incompatible with the overall recreational use of the FERC Project No. 2206.

7. Reservation of Use: The right to use and re-enter the Permit Area for all Project purposes is hereby reserved to Duke Energy and its successors and assigns.

8. Reservation of Authority: No terms or conditions herein contained shall be construed as limiting or affecting in any way the authority of Duke Energy in connection with its exercise of proper protection and administration of its FERC license.

9. Archaeological Resources: If previously unidentified archeological or historical properties are discovered during the course of construction within the Project Boundary, the Permittee shall stop all land clearing or land disturbing activity in the vicinity of the construction area and notify Duke Energy immediately. Duke Energy shall initiate the required consultation process with the State Department of Archives and History, State Historic Preservation Office and the Catawba Indian Nation Tribal Historic Preservation Office. Duke Energy may be required to prepare a cultural resources management plan for approval by FERC that includes but is not limited to the following: (i) a description of each discovered property indicating whether it is listed on, or eligible for listing on the National Register of Historic Places, (ii) a description of the potential effect, and (iii) the proposed measures for avoiding or mitigating the impacts. The Permittee shall be responsible for implementing any required cultural resource management plan. No land clearing or land disturbing activities within the Permit Area shall resume until authorized in writing by Duke Energy.

10. Flooding: Duke Energy reserves the unlimited right to back or flood the waters of the Yadkin-Pee Dee River and its tributaries from time to time and at any and all times over and upon the Permit Area or any portion of the same, to such extent the flooding may be necessary or convenient in connection with the practical operation of its hydroelectric power plants located or to be located in the future upon the Yadkin-Pee Dee River.

11. FERC Project Restoration: Duke Energy shall be under no obligation to Permittee to maintain or continue to operate the Project and should said Project be damaged, destroyed or removed, Duke Energy shall be under no obligation to restore or rebuild same.

12. Parties Bound: This Permit shall be binding upon and inure to the benefit of the parties hereto and their successors in interest and assigns; provided, however, that neither this Permit nor any interest therein may be assigned by Permittee except with the prior written consent of the Duke Energy.

13. Termination & Waiver: It is expressly agreed and understood that the violation of any of the covenants, conditions, terms or provisions of this Permit by Permittee, including but not limited to noncompliance with applicable federal or state regulations, or health and sanitation laws, shall terminate this Permit at the option of the Duke Energy. This Permit may also be terminated by the Duke Energy if at any time during the duration of this Permit (or any renewal thereof) the Permittee should be adjudged bankrupt or insolvent by any federal or state court or the Permittee shall allow a final judgment obtained against it to remain unpaid for a period of sixty (60) days. Failure of Duke Energy to exercise any of said rights relating to the termination of this Permit or any other rights of Duke Energy under this Permit shall not be construed as a waiver or abandonment of the right thereafter to exercise any or all of same. In the event that the Duke Energy terminates this Permit under any of the above written conditions, the Duke Energy may enter the Permit Area premises and expel the Permittee therefrom; or the Duke Energy may, in lieu thereof or in conjunction therewith, pursue any other lawful right or remedy incident to the relationships created by this Permit. Duke Energy must give sixty (60) days' notice in writing to Permittee of its intent to terminate. Permittee shall have the right to cure any violation during said sixty-day notice period, in which event Duke Energy may not terminate this Permit.

14. Non-warranty, As Is: Duke Energy makes no warranty, express or implied, with respect to the title to the Permit Area and the roadway. Permittee accepts the Permit Area in "AS IS" condition.

15. Notices: Wherever in this Permit it shall be required or permitted that notice be given by either party to this Permit to the other, such notice must be in writing and must be given personally or forwarded by certified mail addressed as follows:


To Duke Energy: Duke Energy Carolinas, LLC
Lake Services
526 South Church Street
Charlotte, NC 28202

To Permittee: Department of Transportation
c/o Colin Mellor
1582 Mail Service Center
Raleigh, NC 27699-1582

Such addresses may be changed from time to time by notice given hereunder.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed this the day and year first above written.

Duke Energy:
DUKE ENERGY PROGRESS, LLC
a North Carolina limited liability company

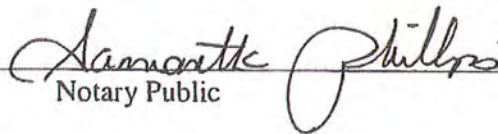
By: 
Name: Eric J Rouse
Title: Manager-Leasing & Property Management

STATE OF NORTH CAROLINA

COUNTY OF Mecklenburg

I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: **Permit For Bridge And Culvert Replacement And Maintenance**

Date: 7/9/2019


Notary Public

My Commission Expires: 9/18/2023

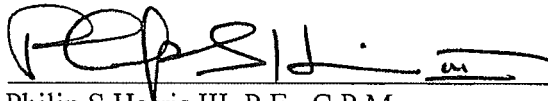


[Signatures Continue on Following Page]

Permittee:

DEPARTMENT OF TRANSPORTATION

an agency of the State of North Carolina

By: 
Name: Philip S Harris III, P.E., C.P.M.
Title: Environmental Analysis Unit Manager Head

STATE OF NORTH CAROLINA

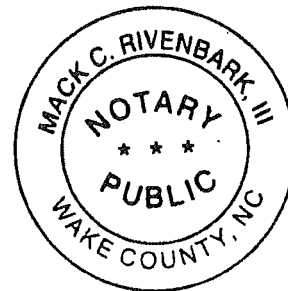
COUNTY OF Wake

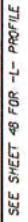
I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: Philip S. Harris, III P.E., C.P.M.

Date: 6/18/19


Notary Public

My Commission Expires: 11/21/19







P-140

Lake Services

Duke Energy
526 S. Church Street / EC12Q
Charlotte, NC 28202

May 29, 2019

North Carolina Department of Transportation
Att. Jeff Hemphill
1000 Birch Ridge Drive
Raleigh, NC 27610

Subject: Project B-4974 Rehabilitation of Bridges 50 & 51 on NC 24/27

Dear Mr. Hemphill:

This letter will serve as your authorization to begin construction of Project B-4974, Rehabilitation of Bridges 50 and 51 on NC 24/27 and the culvert on NC 24/27 east of the bridge. The new permit area will consist of an additional 2.0 acres for the rehabilitation and expansion of the bridges, and .5 acres for the culvert area. This permit is for the new acreage of 2.5 acres within the FERC Project Boundary and work to be done in the existing easement. The project will include a temporary work bridge, temporary rock causeway, and shoreline stabilization. The project must be constructed as submitted in the application. The facilities must be constructed within eighteen (18) months from the date of this letter. A one (1) year extension may be considered if you file a written request with Lake Services prior to the eighteen (18) month deadline and must set forth in this request the reasons why the facilities will not be completed within the allotted time frame.

All work is contingent on submitting all filing fees and signing of the conveyance permit.

Please let me know if you have any questions. My phone number is (704)382-7669.

Sincerely,

A handwritten signature in cursive script that reads 'Ronnie Lawson'.

Ronnie Lawson
Duke Energy Lake Services
EC12Q / 526 South Church Street
Charlotte, NC 28202

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum	L.S.	
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum	L.S.	
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum	L.S.	
0004	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	3 ACR		
0005	0015000000-N	205	SEALING ABANDONED WELLS	4 EA		
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	477,000 CY		
0007	0036000000-E	225	UNDERCUT EXCAVATION	7,000 CY		
0009	0106000000-E	230	BORROW EXCAVATION	316,000 CY		
0010	0134000000-E	240	DRAINAGE DITCH EXCAVATION	10,500 CY		
0011	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	72,600 SY		
0012	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	3,120 SY		
0013	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	23,450 SY		
0014	0192000000-N	260	PROOF ROLLING	30 HR		
0015	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	5,000 CY		
0016	0195000000-E	265	SELECT GRANULAR MATERIAL	11,500 CY		
0017	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZA-TION	246,750 SY		
0018	0199000000-E	SP	TEMPORARY SHORING	29,800 SF		
0019	0223000000-E	275	ROCK PLATING	375 SY		
0020	0225000000-E	SP	REINFORCED SOIL SLOPES	2,350 SY		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0021	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETRO- LEUM CONTAMINATED SOIL	500 TON		
0022	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	5,280 TON		
0023	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	16,580 SY		
0024	0335000000-E	305	*** DRAINAGE PIPE (4")	60 LF		
0025	0335100000-E	305	12" DRAINAGE PIPE	136 LF		
0026	0335200000-E	305	15" DRAINAGE PIPE	9,644 LF		
0027	0335300000-E	305	18" DRAINAGE PIPE	3,388 LF		
0028	0335400000-E	305	24" DRAINAGE PIPE	1,600 LF		
0029	0335500000-E	305	30" DRAINAGE PIPE	1,828 LF		
0030	0335600000-E	305	36" DRAINAGE PIPE	108 LF		
0031	0335700000-E	305	42" DRAINAGE PIPE	740 LF		
0032	0335800000-E	305	48" DRAINAGE PIPE	348 LF		
0033	0343000000-E	310	15" SIDE DRAIN PIPE	1,152 LF		
0034	0344000000-E	310	18" SIDE DRAIN PIPE	336 LF		
0035	0345000000-E	310	24" SIDE DRAIN PIPE	100 LF		
0036	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (15", V)	276 LF		
0037	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (18", V)	340 LF		
0038	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (30", V)	52 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0039	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (48", V)	424 LF		
0040	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	2,816 LF		
0041	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	2,352 LF		
0042	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,148 LF		
0043	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,148 LF		
0044	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	1,828 LF		
0045	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	424 LF		
0046	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	504 LF		
0047	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	184 LF		
0048	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	196 LF		
0049	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	44 LF		
0050	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (72")	248 LF		
0051	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,144 LF		
0052	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,012 LF		
0053	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	1,684 LF		
0054	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,168 LF		
0055	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	656 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0056	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	1,280 LF		
0057	0536000000-E	310	**** HDPE PIPE CULVERTS (8")	4 LF		
0058	0576000000-E	310	*** CS PIPE CULVERTS, ***** THICK (36", 0.079")	56 LF		
0059	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	720 LF		
0060	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	488 LF		
0061	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	64 LF		
0062	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	80 LF		
0063	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (15", 0.064")	31 EA		
0064	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	23 EA		
0065	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (24", 0.064")	2 EA		
0066	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (30", 0.079")	4 EA		
0067	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (36", 0.079")	2 EA		
0068	0995000000-E	340	PIPE REMOVAL	11,448 LF		
0069	1011000000-N	500	FINE GRADING	Lump Sum	L.S.	
0070	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	118,100 SY		
0071	1066000000-E	501	LIME FOR LIME TREATED SOIL	1,420 TON		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0072	1099500000-E	505	SHALLOW UNDERCUT	750 CY		
0073	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,200 TON		
0074	1110000000-E	510	STABILIZER AGGREGATE	250 TON		
0075	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STABILIZATION	62,000 SY		
0076	1121000000-E	520	AGGREGATE BASE COURSE	6,710 TON		
0077	1176000000-E	542	SOIL CEMENT BASE	118,100 SY		
0078	1187000000-E	542	PORTLAND CEMENT FOR SOIL CEMENT BASE	3,310 TON		
0079	1198000000-E	542	AGGREGATE FOR SOIL CEMENT BASE	2,320 TON		
0080	1220000000-E	545	INCIDENTAL STONE BASE	5,000 TON		
0081	1275000000-E	600	PRIME COAT	6,200 GAL		
0082	1308000000-E	607	MILLING ASPHALT PAVEMENT, **** TO ***** (0" TO 3")	16,300 SY		
0083	1330000000-E	607	INCIDENTAL MILLING	3,560 SY		
0084	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	75,850 TON		
0085	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	62,610 TON		
0086	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	8,740 TON		
0087	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	59,810 TON		
0088	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	10,595 TON		
0089	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	3,200 TON		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0090	1869000000-E	710	***** PORT CEM CONC PAVEMENT, MISCELLANEOUS (WITHOUT DOWELS) (8")	470 SY		
0091	2022000000-E	815	SUBDRAIN EXCAVATION	112 CY		
0092	2033000000-E	815	SUBDRAIN FINE AGGREGATE	84 CY		
0093	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	500 LF		
0094	2070000000-N	815	SUBDRAIN PIPE OUTLET	1 EA		
0095	2077000000-E	815	6" OUTLET PIPE	6 LF		
0096	2099000000-E	816	SHOULDER DRAIN	30,330 LF		
0097	2110000000-E	816	4" SHOULDER DRAIN PIPE	30,330 LF		
0098	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	2,550 LF		
0099	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	70 EA		
0100	2143000000-E	818	BLOTTING SAND	20 TON		
0101	2209000000-E	838	ENDWALLS	61 CY		
0102	2220000000-E	838	REINFORCED ENDWALLS	28 CY		
0103	2253000000-E	840	PIPE COLLARS	2 CY		
0104	2264000000-E	840	PIPE PLUGS	1 CY		
0105	2275000000-E	SP	FLOWABLE FILL	124 CY		
0106	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	446 EA		
0107	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	6 CY		
0108	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	293 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0109	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	23 EA		
0110	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	59 EA		
0111	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	159 EA		
0112	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	10 EA		
0113	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	22 EA		
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	13 EA		
0115	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	60 EA		
0116	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	64 EA		
0117	2396000000-N	840	FRAME WITH COVER, STD 840.54	11 EA		
0118	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	17 EA		
0119	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	42 EA		
0120	2473000000-N	SP	GENERIC DRAINAGE ITEM SANDBAGS	210 EA		
0121	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN #1	Lump Sum	L.S.	
0122	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN #2	Lump Sum	L.S.	
0123	2535000000-E	846	***X *** CONCRETE CURB (8" X 18")	335 LF		
0124	2538000000-E	846	***-*** CONCRETE CURB & GUTTER (2'-0")	180 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0125	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	6,980	LF	
0126	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	20,350	LF	
0127	2556000000-E	846	SHOULDER BERM GUTTER	5,270	LF	
0128	2570000000-N	SP	MODIFIED CONCRETE FLUME	2	EA	
0129	2591000000-E	848	4" CONCRETE SIDEWALK	7,840	SY	
0130	2605000000-N	848	CONCRETE CURB RAMPS	70	EA	
0131	2612000000-E	848	6" CONCRETE DRIVEWAY	2,240	SY	
0132	2619000000-E	850	4" CONCRETE PAVED DITCH	33	SY	
0133	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	11,050	SY	
0134	2657000000-E	852	*** MONOLITHIC CONCRETE MEDIAN (****) (5", KEYED IN)	330	SY	
0135	2759000000-N	SP	GENERIC PAVING ITEM PRECAST CONCRETE PARKING CURBS	17	EA	
0136	2800000000-N	858	ADJUSTMENT OF CATCH BASINS	1	EA	
0137	2830000000-N	858	ADJUSTMENT OF MANHOLES	51	EA	
0138	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	228	EA	
0139	3030000000-E	862	STEEL BEAM GUARDRAIL	9,925	LF	
0140	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	200	LF	
0141	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25	EA	
0142	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	2	EA	
0143	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	13	EA	

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0144	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	37 EA		
0145	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	2 EA		
0146	3360000000-E	863	REMOVE EXISTING GUARDRAIL	2,175 LF		
0147	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	10,775 LF		
0148	3382000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL (SHOP CURVED)	250 LF		
0149	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	40 EA		
0150	3563000000-E	SP	TEMP *** WOVEN WIRE FENCE, COMPLETE W/POSTS (47")	7,000 LF		
0151	3628000000-E	876	RIP RAP, CLASS I	5,900 TON		
0152	3635000000-E	876	RIP RAP, CLASS II	50 TON		
0153	3649000000-E	876	RIP RAP, CLASS B	3,470 TON		
0154	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	20,120 SY		
0155	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN- DATIONS	1 CY		
0156	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA- TIONS	2 CY		
0157	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	1,472 LB		
0158	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,216 LB		
0159	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	7,085 LF		
0160	4096000000-N	904	SIGN ERECTION, TYPE D	21 EA		
0161	4102000000-N	904	SIGN ERECTION, TYPE E	336 EA		
0162	4108000000-N	904	SIGN ERECTION, TYPE F	56 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	6 EA		
0164	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	3 EA		
0165	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U- CHANNEL	209 EA		
0166	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	9 EA		
0167	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	3,046 SF		
0168	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	1,701 SF		
0169	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	1,706 SF		
0170	4415000000-N	1115	FLASHING ARROW BOARD	2 EA		
0171	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2 EA		
0172	4430000000-N	1130	DRUMS	2,000 EA		
0173	4435000000-N	1135	CONES	300 EA		
0174	4445000000-E	1145	BARRICADES (TYPE III)	1,168 LF		
0175	4455000000-N	1150	FLAGGER	976 DAY		
0176	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	20 EA		
0177	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	9 EA		
0178	4480000000-N	1165	TMA	2 EA		
0179	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,410 LF		
0180	4500000000-E	1170	REMOVE & RESET PORTABLE CONC- RETE BARRIER	2,860 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0181	4510000000-N	1190	LAW ENFORCEMENT	120 HR		
0182	4516000000-N	1180	SKINNY DRUM	400 EA		
0183	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	3,847 EA		
0184	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	193,643 LF		
0185	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	29,927 LF		
0186	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	2,075 LF		
0187	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	4 EA		
0188	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	377 EA		
0189	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)	5,317 LF		
0190	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	6,750 LF		
0191	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	802,500 LF		
0192	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	13,022 LF		
0193	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	360 LF		
0194	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	4,122 LF		
0195	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	16 EA		
0196	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	382 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0197	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	90,916 LF		
0198	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	1,060 LF		
0199	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	45 LF		
0200	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	602 LF		
0201	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	55 EA		
0202	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	740 LF		
0203	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	8 EA		
0204	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	3,070 EA		
0205	5325200000-E	1510	2" WATER LINE	1,378 LF		
0206	5325600000-E	1510	6" WATER LINE	1,768 LF		
0207	5325800000-E	1510	8" WATER LINE	3,922 LF		
0208	5326000000-E	1510	10" WATER LINE	167 LF		
0209	5326200000-E	1510	12" WATER LINE	39,165 LF		
0210	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	61,285 LB		
0211	5536000000-E	1515	2" VALVE	6 EA		
0212	5540000000-E	1515	6" VALVE	67 EA		
0213	5546000000-E	1515	8" VALVE	34 EA		
0214	5552000000-E	1515	10" VALVE	2 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0215	5558000000-E	1515	12" VALVE	76 EA		
0216	5571600000-E	1515	6" TAPPING SLEEVE & VALVE	1 EA		
0217	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	4 EA		
0218	5572000000-E	1515	10" TAPPING SLEEVE & VALVE	1 EA		
0219	5606000000-E	1515	2" BLOW OFF	3 EA		
0220	5643000000-E	1515	*** WATER METER (1")	5 EA		
0221	5643100000-E	1515	3/4" WATER METER	88 EA		
0222	5643200000-E	1515	2" WATER METER	3 EA		
0223	5648000000-N	1515	RELOCATE WATER METER	12 EA		
0224	5649000000-N	1515	RECONNECT WATER METER	28 EA		
0225	5656000000-E	1515	*** RPZ BACKFLOW PREVENTION ASSEMBLY (1")	3 EA		
0226	5656000000-E	1515	*** RPZ BACKFLOW PREVENTION ASSEMBLY (3/4")	1 EA		
0227	5656200000-E	1515	2" RPZ BACKFLOW PREVENTION ASSEMBLY	3 EA		
0228	5666000000-N	1515	FIRE HYDRANT	29 EA		
0229	5672000000-N	1515	RELOCATE FIRE HYDRANT	3 EA		
0230	5673000000-E	1515	FIRE HYDRANT LEG	335 LF		
0231	5686500000-E	1515	WATER SERVICE LINE	10,168 LF		
0232	5691300000-E	1520	8" SANITARY GRAVITY SEWER	1,904 LF		
0233	5691400000-E	1520	10" SANITARY GRAVITY SEWER	4,316 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0234	5691500000-E	1520	12" SANITARY GRAVITY SEWER	1,916 LF		
0235	5709200000-E	1520	4" FORCE MAIN SEWER	1,319 LF		
0236	5709600000-E	1520	12" FORCE MAIN SEWER	865 LF		
0237	5768000000-N	1520	SANITARY SEWER CLEAN-OUT	29 EA		
0238	5768500000-E	1520	SEWER SERVICE LINE	1,993 LF		
0239	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	4,085 LB		
0240	5773000000-N	SP	UTILITY VAULT	1 EA		
0241	5775000000-E	1525	4' DIA UTILITY MANHOLE	51 EA		
0242	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	189 LF		
0243	5798000000-E	1530	ABANDON *** UTILITY PIPE (2")	655 LF		
0244	5800000000-E	1530	ABANDON 6" UTILITY PIPE	1,345 LF		
0245	5801000000-E	1530	ABANDON 8" UTILITY PIPE	9,129 LF		
0246	5802000000-E	1530	ABANDON 10" UTILITY PIPE	4,082 LF		
0247	5804000000-E	1530	ABANDON 12" UTILITY PIPE	36,003 LF		
0248	5815000000-N	1530	REMOVE WATER METER	97 EA		
0249	5815500000-N	1530	REMOVE FIRE HYDRANT	29 EA		
0250	5828000000-N	1530	REMOVE UTILITY MANHOLE	36 EA		
0251	5835700000-E	1540	16" ENCASEMENT PIPE	120 LF		
0252	5835900000-E	1540	20" ENCASEMENT PIPE	40 LF		
0253	5836000000-E	1540	24" ENCASEMENT PIPE	280 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0254	5872500000-E	1550	BORE AND JACK OF *** (16")	120 LF		
0255	5872500000-E	1550	BORE AND JACK OF *** (20")	40 LF		
0256	5872500000-E	1550	BORE AND JACK OF *** (24")	280 LF		
0257	5877000000-N	SP	SANITARY SEWER PUMP STATION	Lump Sum	L.S.	
0258	6000000000-E	1605	TEMPORARY SILT FENCE	182,000 LF		
0259	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	4,550 TON		
0260	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	18,100 TON		
0261	6012000000-E	1610	SEDIMENT CONTROL STONE	38,000 TON		
0262	6015000000-E	1615	TEMPORARY MULCHING	512.5 ACR		
0263	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	19,500 LB		
0264	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	97.5 TON		
0265	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,810 LF		
0266	6029000000-E	SP	SAFETY FENCE	10,400 LF		
0267	6030000000-E	1630	SILT EXCAVATION	30,930 CY		
0268	6036000000-E	1631	MATTING FOR EROSION CONTROL	220,000 SY		
0269	6037000000-E	SP	COIR FIBER MAT	100 SY		
0270	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	2,030 SY		
0271	6042000000-E	1632	1/4" HARDWARE CLOTH	31,280 LF		
0272	6045000000-E	SP	*** TEMPORARY PIPE (15")	36 LF		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0273	6045000000-E	SP	*** TEMPORARY PIPE (18")	40 LF		
0274	6045000000-E	SP	*** TEMPORARY PIPE (24")	1,320 LF		
0275	6045000000-E	SP	*** TEMPORARY PIPE (30")	56 LF		
0276	6045000000-E	SP	*** TEMPORARY PIPE (36")	80 LF		
0277	6045000000-E	SP	*** TEMPORARY PIPE (42")	134 LF		
0278	6045000000-E	SP	*** TEMPORARY PIPE (48")	2,300 LF		
0279	6045000000-E	SP	*** TEMPORARY PIPE (54")	40 LF		
0280	6045000000-E	SP	*** TEMPORARY PIPE (60")	40 LF		
0281	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	275 LF		
0282	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	1,670 SY		
0283	6070000000-N	1639	SPECIAL STILLING BASINS	50 EA		
0284	6071012000-E	SP	COIR FIBER WATTLE	3,700 LF		
0285	6071014000-E	SP	COIR FIBER WATTLE BARRIER	530 LF		
0286	6071020000-E	SP	POLYACRYLAMIDE (PAM)	3,300 LB		
0287	6071030000-E	1640	COIR FIBER BAFFLE	2,000 LF		
0288	6071050000-E	SP	*** SKIMMER (1-1/2")	51 EA		
0289	6071050000-E	SP	*** SKIMMER (2")	6 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0290	6071050000-E	SP	*** SKIMMER (4")	1 EA		
0291	6084000000-E	1660	SEEDING & MULCHING	273 ACR		
0292	6087000000-E	1660	MOWING	321 ACR		
0293	6090000000-E	1661	SEED FOR REPAIR SEEDING	5,200 LB		
0294	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	13.75 TON		
0295	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	6,825 LB		
0296	6108000000-E	1665	FERTILIZER TOPDRESSING	205 TON		
0297	6111000000-E	SP	IMPERVIOUS DIKE	450 LF		
0298	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR		
0299	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	150 EA		
0300	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	10 EA		
0301	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	8 EA		
0302	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	16 EA		
0303	6141000000-E	SP	GENERIC EROSION CONTROL ITEM IMPERVIOUS PLASTIC	2,045 SY		
0304	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	8 EA		
0305	7060000000-E	1705	SIGNAL CABLE	5,050 LF		
0306	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	27 EA		
0307	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	7 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0308	7252000000-E	1710	MESSENGER CABLE (1/4")	560 LF		
0309	7264000000-E	1710	MESSENGER CABLE (3/8")	1,550 LF		
0310	7300000000-E	1715	UNPAVED TRENCHING (*****) (1, 2")	1,300 LF		
0311	7300000000-E	1715	UNPAVED TRENCHING (*****) (2, 2")	240 LF		
0312	7300000000-E	1715	UNPAVED TRENCHING (*****) (4, 2")	75 LF		
0313	7301000000-E	1715	DIRECTIONAL DRILL (*****) (1, 2")	170 LF		
0314	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	23 EA		
0315	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEA- VY DUTY)	3 EA		
0316	7360000000-N	1720	WOOD POLE	2 EA		
0317	7372000000-N	1721	GUY ASSEMBLY	8 EA		
0318	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA		
0319	7420000000-E	1722	2" RISER WITH WEATHERHEAD	2 EA		
0320	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	1 EA		
0321	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	3,150 LF		
0322	7456000000-E	1726	LEAD-IN CABLE (***** (14-2)	10,700 LF		
0323	7481000000-N	SP	SITE SURVEY	2 EA		
0324	7481200000-N	SP	LUMINAIRE ARM FOR VIDEO SYSTEM	7 EA		
0325	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	7 EA		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
0326	7481260000-N	SP	EXTERNAL LOOP EMULATOR PROCESSING UNIT	2 EA		
0327	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	8 EA		
0328	7528000000-E	1730	DROP CABLE	600 LF		
0329	7540000000-N	1731	SPLICE ENCLOSURE	1 EA		
0330	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	1 EA		
0331	7552000000-N	1731	INTERCONNECT CENTER	1 EA		
0332	7576000000-N	SP	METAL STRAIN SIGNAL POLE	4 EA		
0333	7613000000-N	SP	SOIL TEST	4 EA		
0334	7614100000-E	SP	DRILLED PIER FOUNDATION	24 CY		
0335	7636000000-N	1745	SIGN FOR SIGNALS	10 EA		
0336	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	8 EA		
0337	7684000000-N	1750	SIGNAL CABINET FOUNDATION	1 EA		
0338	7696000000-N	1751	CONTROLLERS WITH CABINET (*****) (2070E, BASE MOUNTED)	1 EA		
0339	7744000000-N	1751	DETECTOR CARD (TYPE 170)	13 EA		
0340	7901000000-N	1753	CABINET BASE EXTENDER	1 EA		
0341	7990000000-E	SP	GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE	200 LF		
0360	1209000000-E	543	ASPHALT CURING SEAL	35,430 GAL		

County : Stanly, Montgomery

Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount
CULVERT ITEMS						
0342	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (24+95.00 -Y2-)	Lump Sum	L.S.	
0343	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (305+27.00 -L-)	Lump Sum	L.S.	
0344	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (363+00.00 -L-)	Lump Sum	L.S.	
0345	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (38+76.00 -L-)	Lump Sum	L.S.	
0346	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (381+64.00 -L-)	Lump Sum	L.S.	
0347	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (53+01.00 -L-)	Lump Sum	L.S.	
0348	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (93+58.00 -L-)	Lump Sum	L.S.	
0349	8126000000-N	414	CULVERT EXCAVATION, STA ***** (24+95.00 -Y2-)	Lump Sum	L.S.	
0350	8126000000-N	414	CULVERT EXCAVATION, STA ***** (305+27.00 -L-)	Lump Sum	L.S.	
0351	8126000000-N	414	CULVERT EXCAVATION, STA ***** (363+00.00 -L-)	Lump Sum	L.S.	
0352	8126000000-N	414	CULVERT EXCAVATION, STA ***** (38+76.00 -L-)	Lump Sum	L.S.	
0353	8126000000-N	414	CULVERT EXCAVATION, STA ***** (381+64.00 -L-)	Lump Sum	L.S.	
0354	8126000000-N	414	CULVERT EXCAVATION, STA ***** (53+01.00 -L-)	Lump Sum	L.S.	
0355	8126000000-N	414	CULVERT EXCAVATION, STA ***** (93+58.00 -L-)	Lump Sum	L.S.	
0356	8133000000-E	414	FOUNDATION CONDITIONING MATERIAL, BOX CULVERT	1,422 TON		

Oct 08, 2019 12:22 pm			ITEMIZED PROPOSAL FOR CONTRACT NO. C204181			Page 21 of 21	
County : Stanly, Montgomery							
Line #	Item Number	Sec #	Description	Quantity	Unit Cost	Amount	
0357	8196000000-E	420	CLASS A CONCRETE (CULVERT)	2,349.6 CY			
0358	8245000000-E	425	REINFORCING STEEL (CULVERT)	325,427 LB			
WALL ITEMS							
0359	8802040000-E	453	CIP GRAVITY RETAINING WALLS	380 SF			
1222/Oct08/Q4392008.35/D1457268696000/E359							
Total Amount Of Bid For Entire Project :							

DBE GOAL SET: 11.00%
DBE GOAL OBT: 11.03%

Vendor 1 of 3: BLYTHE DEVELOPMENT CO (3740) Call Order 002 (Proposal: C204181)

Bid Information

Proposal County: STANLY MONTGOMERY
Vendor Address:
Signature Check: Franklin Williams Blythe
Time Bid Received: October 15, 2019 01:38 PM
Amendment Count: 2

Bid Checksum: 0E5DFBF98F
Bid Total: \$64,856,499.30
Items Total: \$64,856,499.30
Time Total: \$0.00

Bidding Errors:
None.

Vendor 1 of 3: BLYTHE DEVELOPMENT CO (3740)
Call Order 002 (Proposal: C204181)

Bid Bond Information

Projects:	Bond Maximum:
Counties:	State of Incorporation: Massachusetts
Bond ID: SNC19648160	Agency Execution Date: 10/9/2019 2
Paid by Check: No	Surety Name: Surety2000
Bond Percent: 5%	Bond Agency Name: Liberty Mutual Insurance Company

Letting: L191015
10/15/2019 02:00:00 PM

North Carolina Department of Transportation
3740 - Blythe Development Company

Contract ID: C204181
Call: 002

DBE Load Information

Letting ID: L191015
Letting Date: 10/15/2019
Call Order: 002
Contract ID: C204181
Project: STATE FUNDEDSTATE FUNDEDSTATE FUNDEDSTATE FUNDED
Bid Total: \$64856499.30
DBE Goal: 11.00% (\$7,134,214.92)

Vendor ID: 3740
Vendor Name: Blythe Development Company
DBE Entered: 11.03% (\$7,155,072.52)

Letting: L191015
10/15/2019 02:00:00 PM

North Carolina Department of Transportation
3740 - Blythe Development Company

Contract ID: C204181
Call: 002

BondID: SNC19648160

Surety Registry Agency: Surety2000

Verified?: 1

Surety Agency: Liberty Mutual Insurance Company

Bond Execution Date: 10/9/2019 2:50:52 PM

Line Number	Item Number	Quantity	Unit	Unit Price	Extension Price
Section 0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0001	0000100000-N MOBILIZATION	1.000	LS	\$3,170,000.0000	\$3,170,000.00
0002	0000400000-N CONSTRUCTION SURVEYING	1.000	LS	\$890,000.0000	\$890,000.00
0003	0001000000-E CLEARING & GRUBBING .. ACRE(S)	1.000	LS	\$6,891,947.0000	\$6,891,947.00
0004	0008000000-E SUPPLEMENTARY CLEARING & GRUB-BING	3.000	ACR	\$10,000.0000	\$30,000.00
0005	0015000000-N SEALING ABANDONED WELLS	4.000	EA	\$2,426.7600	\$9,707.04
0006	0022000000-E UNCLASSIFIED EXCAVATION	477000.000	CY	\$6.7000	\$3,195,900.00
0007	0036000000-E UNDERCUT EXCAVATION	7000.000	CY	\$15.6500	\$109,550.00
0009	0106000000-E BORROW EXCAVATION	316000.000	CY	\$0.1000	\$31,600.00
0010	0134000000-E DRAINAGE DITCH EXCAVATION	10500.000	CY	\$7.9800	\$83,790.00
0011	0156000000-E REMOVAL OF EXISTING ASPHALT PAVEMENT	72600.000	SY	\$4.1900	\$304,194.00
0012	0163000000-E REMOVAL OF EXISTING CONCRETE PAVEMENT	3120.000	SY	\$7.5500	\$23,556.00
0013	0177000000-E BREAKING OF EXISTING ASPHALT PAVEMENT	23450.000	SY	\$4.0300	\$94,503.50
0014	0192000000-N PROOF ROLLING	30.000	HR	\$219.3500	\$6,580.50
0015	0194000000-E SELECT GRANULAR MATERIAL, CLASS III	5000.000	CY	\$32.1700	\$160,850.00
0016	0195000000-E SELECT GRANULAR MATERIAL	11500.000	CY	\$8.4000	\$96,600.00
0017	0196000000-E GEOTEXTILE FOR SOIL STABILIZA-TION	246750.000	SY	\$1.8900	\$466,357.50
0018	0199000000-E TEMPORARY SHORING	29800.000	SF	\$49.1800	\$1,465,564.00
0019	0223000000-E ROCK PLATING	375.000	SY	\$42.8800	\$16,080.00
0020	0225000000-E REINFORCED SOIL SLOPES	2350.000	SY	\$215.0000	\$505,250.00
0021	0255000000-E GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETRO- LEUM CONTAMINATED SOIL	500.000	TON	\$118.3300	\$59,165.00
0022	0318000000-E FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	5280.000	TON	\$35.0000	\$184,800.00
0023	0320000000-E FOUNDATION CONDITIONING GEO- TEXTILE	16580.000	SY	\$2.7700	\$45,926.60
0024	0335000000-E **" DRAINAGE PIPE (4")	60.000	LF	\$101.2200	\$6,073.20

0025	0335100000-E	136.000	LF	\$60.7500	\$8,262.00
	12" DRAINAGE PIPE				
0026	0335200000-E	9644.000	LF	\$46.7700	\$451,049.88
	15" DRAINAGE PIPE				
0027	0335300000-E	3388.000	LF	\$50.0900	\$169,704.92
	18" DRAINAGE PIPE				
0028	0335400000-E	1600.000	LF	\$53.8900	\$86,224.00
	24" DRAINAGE PIPE				
0029	0335500000-E	1828.000	LF	\$71.2700	\$130,281.56
	30" DRAINAGE PIPE				
0030	0335600000-E	108.000	LF	\$117.4100	\$12,680.28
	36" DRAINAGE PIPE				
0031	0335700000-E	740.000	LF	\$140.9100	\$104,273.40
	42" DRAINAGE PIPE				
0032	0335800000-E	348.000	LF	\$171.3000	\$59,612.40
	48" DRAINAGE PIPE				
0033	0343000000-E	1152.000	LF	\$43.6700	\$50,307.84
	15" SIDE DRAIN PIPE				
0034	0344000000-E	336.000	LF	\$53.8900	\$18,107.04
	18" SIDE DRAIN PIPE				
0035	0345000000-E	100.000	LF	\$94.4300	\$9,443.00
	24" SIDE DRAIN PIPE				
0036	0354000000-E	276.000	LF	\$57.7100	\$15,927.96
	" RC PIPE CULVERTS, CLASS ** (15", V)				
0037	0354000000-E	340.000	LF	\$68.9300	\$23,436.20
	" RC PIPE CULVERTS, CLASS ** (18", V)				
0038	0354000000-E	52.000	LF	\$132.5500	\$6,892.60
	" RC PIPE CULVERTS, CLASS ** (30", V)				
0039	0354000000-E	424.000	LF	\$188.9300	\$80,106.32
	" RC PIPE CULVERTS, CLASS ** (48", V)				
0040	0366000000-E	2816.000	LF	\$44.1500	\$124,326.40
	15" RC PIPE CULVERTS, CLASS III				
0041	0372000000-E	2352.000	LF	\$49.6900	\$116,870.88
	18" RC PIPE CULVERTS, CLASS III				
0042	0378000000-E	2148.000	LF	\$63.5800	\$136,569.84
	24" RC PIPE CULVERTS, CLASS III				
0043	0384000000-E	1148.000	LF	\$86.5000	\$99,302.00
	30" RC PIPE CULVERTS, CLASS III				
0044	0390000000-E	1828.000	LF	\$110.4500	\$201,902.60
	36" RC PIPE CULVERTS, CLASS III				
0045	0396000000-E	424.000	LF	\$143.1700	\$60,704.08
	42" RC PIPE CULVERTS, CLASS III				
0046	0402000000-E	504.000	LF	\$151.0000	\$76,104.00
	48" RC PIPE CULVERTS, CLASS III				
0047	0414000000-E	184.000	LF	\$270.0000	\$49,680.00
	60" RC PIPE CULVERTS, CLASS III				
0048	0420000000-E	196.000	LF	\$334.0000	\$65,464.00
	66" RC PIPE CULVERTS, CLASS III				
0049	0448000000-E	44.000	LF	\$170.0000	\$7,480.00

***** RC PIPE CULVERTS, CLASS IV (48")					
0050	0448000000-E	248.000	LF	\$440.0000	\$109,120.00
***** RC PIPE CULVERTS, CLASS IV (72")					
0051	0448200000-E	8144.000	LF	\$48.0000	\$390,912.00
15" RC PIPE CULVERTS, CLASS IV					
0052	0448300000-E	3012.000	LF	\$52.2300	\$157,316.76
18" RC PIPE CULVERTS, CLASS IV					
0053	0448400000-E	1684.000	LF	\$70.0000	\$117,880.00
24" RC PIPE CULVERTS, CLASS IV					
0054	0448500000-E	1168.000	LF	\$100.0000	\$116,800.00
30" RC PIPE CULVERTS, CLASS IV					
0055	0448600000-E	656.000	LF	\$141.0000	\$92,496.00
36" RC PIPE CULVERTS, CLASS IV					
0056	0448700000-E	1280.000	LF	\$162.0000	\$207,360.00
42" RC PIPE CULVERTS, CLASS IV					
0057	0536000000-E	4.000	LF	\$85.8500	\$343.40
***** HDPE PIPE CULVERTS (8")					
0058	0576000000-E	56.000	LF	\$120.3800	\$6,741.28
*** CS PIPE CULVERTS, ***** THICK (36", 0.079")					
0059	0582000000-E	720.000	LF	\$46.5700	\$33,530.40
15" CS PIPE CULVERTS, 0.064" THICK					
0060	0588000000-E	488.000	LF	\$57.1200	\$27,874.56
18" CS PIPE CULVERTS, 0.064" THICK					
0061	0594000000-E	64.000	LF	\$73.2800	\$4,689.92
24" CS PIPE CULVERTS, 0.064" THICK					
0062	0600000000-E	80.000	LF	\$89.1700	\$7,133.60
30" CS PIPE CULVERTS, 0.079" THICK					
0063	0636000000-E	31.000	EA	\$592.8100	\$18,377.11
*** CS PIPE ELBOWS, ***** THICK (15", 0.064")					
0064	0636000000-E	23.000	EA	\$645.8600	\$14,854.78
*** CS PIPE ELBOWS, ***** THICK (18", 0.064")					
0065	0636000000-E	2.000	EA	\$673.9800	\$1,347.96
*** CS PIPE ELBOWS, ***** THICK (24", 0.064")					
0066	0636000000-E	4.000	EA	\$940.0300	\$3,760.12
*** CS PIPE ELBOWS, ***** THICK (30", 0.079")					
0067	0636000000-E	2.000	EA	\$1,085.2500	\$2,170.50
*** CS PIPE ELBOWS, ***** THICK (36", 0.079")					
0068	0995000000-E	11448.000	LF	\$12.0000	\$137,376.00
PIPE REMOVAL					
0069	1011000000-N	1.000	LS	\$2,008,869.0000	\$2,008,869.00
FINE GRADING					
0070	1044000000-E	118100.000	SY	\$2.6500	\$312,965.00
LIME TREATED SOIL (SLURRY METHOD)					
0071	1066000000-E	1420.000	TON	\$228.0000	\$323,760.00
LIME FOR LIME TREATED SOIL					
0072	1099500000-E	750.000	CY	\$16.9400	\$12,705.00
SHALLOW UNDERCUT					
0073	1099700000-E	2200.000	TON	\$30.7500	\$67,650.00
CLASS IV SUBGRADE STABILIZATION					

0074	1110000000-E	250.000	TON	\$37.3700	\$9,342.50
	STABILIZER AGGREGATE				
0075	1115000000-E	62000.000	SY	\$3.4100	\$211,420.00
	GEOTEXTILE FOR PAVEMENT STA- BILIZATION				
0076	1121000000-E	6710.000	TON	\$35.0000	\$234,850.00
	AGGREGATE BASE COURSE				
0077	1176000000-E	118100.000	SY	\$2.5000	\$295,250.00
	SOIL CEMENT BASE				
0078	1187000000-E	3310.000	TON	\$188.0000	\$622,280.00
	PORTLAND CEMENT FOR SOIL CE- MENT BASE				
0079	1198000000-E	2320.000	TON	\$21.8600	\$50,715.20
	AGGREGATE FOR SOIL CEMENT BASE				
0080	1220000000-E	5000.000	TON	\$33.3800	\$166,900.00
	INCIDENTAL STONE BASE				
0081	1275000000-E	6200.000	GAL	\$3.6700	\$22,754.00
	PRIME COAT				
0082	1308000000-E	16300.000	SY	\$3.6000	\$58,680.00
	MILLING ASPHALT PAVEMENT, ***"TO *****" (0" TO 3")				
0083	1330000000-E	3560.000	SY	\$9.1000	\$32,396.00
	INCIDENTAL MILLING				
0084	1491000000-E	75850.000	TON	\$48.5000	\$3,678,725.00
	ASPHALT CONC BASE COURSE, TYPE B25.0C				
0085	1503000000-E	62610.000	TON	\$48.5000	\$3,036,585.00
	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				
0086	1519000000-E	8740.000	TON	\$51.0000	\$445,740.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5B				
0087	1523000000-E	59810.000	TON	\$47.5000	\$2,840,975.00
	ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
0088	1575000000-E	10595.000	TON	\$570.0000	\$6,039,150.00
	ASPHALT BINDER FOR PLANT MIX				
0089	1693000000-E	3200.000	TON	\$150.0000	\$480,000.00
	ASPHALT PLANT MIX, PAVEMENT REPAIR				
0090	1869000000-E	470.000	SY	\$180.0000	\$84,600.00
	*****" PORT CEM CONC PAVEMENT,MISCELLANEOUS (WITHOUT DOWELS) (8")				
0091	2022000000-E	112.000	CY	\$26.9700	\$3,020.64
	SUBDRAIN EXCAVATION				
0092	2033000000-E	84.000	CY	\$54.4700	\$4,575.48
	SUBDRAIN FINE AGGREGATE				
0093	2044000000-E	500.000	LF	\$5.1100	\$2,555.00
	6" PERFORATED SUBDRAIN PIPE				
0094	2070000000-N	1.000	EA	\$470.6600	\$470.66
	SUBDRAIN PIPE OUTLET				
0095	2077000000-E	6.000	LF	\$12.7100	\$76.26
	6" OUTLET PIPE				
0096	2099000000-E	30330.000	LF	\$7.2500	\$219,892.50
	SHOULDER DRAIN				
0097	2110000000-E	30330.000	LF	\$1.2500	\$37,912.50
	4" SHOULDER DRAIN PIPE				
0098	2121000000-E	2550.000	LF	\$17.5000	\$44,625.00

4" OUTLET PIPE FOR SHOULDER		DRAINS			
0099	2132000000-N	70.000	EA	\$285.0000	\$19,950.00
	CONCRETE PAD FOR SHOULDER	DRAIN PIPE OUTLET			
0100	2143000000-E	20.000	TON	\$48.1700	\$963.40
	BLOTTING SAND				
0101	2209000000-E	61.000	CY	\$1,189.2900	\$72,546.69
	ENDWALLS				
0102	2220000000-E	28.000	CY	\$1,250.0000	\$35,000.00
	REINFORCED ENDWALLS				
0103	2253000000-E	2.000	CY	\$1,910.0000	\$3,820.00
	PIPE COLLARS				
0104	2264000000-E	1.000	CY	\$2,485.0000	\$2,485.00
	PIPE PLUGS				
0105	2275000000-E	124.000	CY	\$240.0000	\$29,760.00
	FLOWABLE FILL				
0106	2286000000-N	446.000	EA	\$2,700.0000	\$1,204,200.00
	MASONRY DRAINAGE STRUCTURES				
0107	2297000000-E	6.000	CY	\$2,700.0000	\$16,200.00
	MASONRY DRAINAGE STRUCTURES				
0108	2308000000-E	293.000	LF	\$390.0000	\$114,270.00
	MASONRY DRAINAGE STRUCTURES				
0109	2364000000-N	23.000	EA	\$756.3600	\$17,396.28
	FRAME WITH TWO GRATES, STD	840.16			
0110	2364200000-N	59.000	EA	\$863.0600	\$50,920.54
	FRAME WITH TWO GRATES, STD	840.20			
0111	2365000000-N	159.000	EA	\$696.5700	\$110,754.63
	FRAME WITH TWO GRATES, STD	840.22			
0112	2366000000-N	10.000	EA	\$537.3800	\$5,373.80
	FRAME WITH TWO GRATES, STD	840.24			
0113	2367000000-N	22.000	EA	\$614.3200	\$13,515.04
	FRAME WITH TWO GRATES, STD	840.29			
0114	2374000000-N	13.000	EA	\$620.2500	\$8,063.25
	FRAME WITH GRATE & HOOD, STD	840.03, TYPE **	(E)		
0115	2374000000-N	60.000	EA	\$652.2100	\$39,132.60
	FRAME WITH GRATE & HOOD, STD	840.03, TYPE **	(F)		
0116	2374000000-N	64.000	EA	\$684.1700	\$43,786.88
	FRAME WITH GRATE & HOOD, STD	840.03, TYPE **	(G)		
0117	2396000000-N	11.000	EA	\$454.3600	\$4,997.96
	FRAME WITH COVER, STD	840.54			
0118	2440000000-N	17.000	EA	\$850.0000	\$14,450.00
	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN				
0119	2451000000-N	42.000	EA	\$1,200.0000	\$50,400.00
	CONCRETE TRANSITIONAL SECTION FOR DROP INLET				
0120	2473000000-N	210.000	EA	\$15.9300	\$3,345.30
	GENERIC DRAINAGE ITEM SANDBAGS				
0121	2474000000-N	1.000	LS	\$65,000.0000	\$65,000.00
	GENERIC DRAINAGE ITEM FILTRATION BASIN #1				
0122	2474000000-N	1.000	LS	\$65,000.0000	\$65,000.00
	GENERIC DRAINAGE ITEM FILTRATION BASIN #2				

0123	2535000000-E	335.000	LF	\$20.0000	\$6,700.00
	***X *** CONCRETE CURB (8" X 18")				
0124	2538000000-E	180.000	LF	\$20.0000	\$3,600.00
	'- CONCRETE CURB & GUTTER (2'-0")				
0125	2542000000-E	6980.000	LF	\$17.0000	\$118,660.00
	1'-6" CONCRETE CURB & GUTTER				
0126	2549000000-E	20350.000	LF	\$19.0000	\$386,650.00
	2'-6" CONCRETE CURB & GUTTER				
0127	2556000000-E	5270.000	LF	\$23.0000	\$121,210.00
	SHOULDER BERM GUTTER				
0128	2570000000-N	2.000	EA	\$1,600.0000	\$3,200.00
	MODIFIED CONCRETE FLUME				
0129	2591000000-E	7840.000	SY	\$40.0000	\$313,600.00
	4" CONCRETE SIDEWALK				
0130	2605000000-N	70.000	EA	\$1,700.0000	\$119,000.00
	CONCRETE CURB RAMPS				
0131	2612000000-E	2240.000	SY	\$50.0000	\$112,000.00
	6" CONCRETE DRIVEWAY				
0132	2619000000-E	33.000	SY	\$45.0000	\$1,485.00
	4" CONCRETE PAVED DITCH				
0133	2655000000-E	11050.000	SY	\$55.0000	\$607,750.00
	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)				
0134	2657000000-E	330.000	SY	\$58.0000	\$19,140.00
	*** MONOLITHIC CONCRETE MEDIAN(*****) (5", KEYED IN)				
0135	2759000000-N	17.000	EA	\$115.5700	\$1,964.69
	GENERIC PAVING ITEM PRECAST CONCRETE PARKING CURBS				
0136	2800000000-N	1.000	EA	\$1,408.5300	\$1,408.53
	ADJUSTMENT OF CATCH BASINS				
0137	2830000000-N	51.000	EA	\$781.2000	\$39,841.20
	ADJUSTMENT OF MANHOLES				
0138	2845000000-N	228.000	EA	\$268.6900	\$61,261.32
	ADJUSTMENT OF METER BOXES OR VALVE BOXES				
0139	3030000000-E	9925.000	LF	\$16.0000	\$158,800.00
	STEEL BEAM GUARDRAIL				
0140	3045000000-E	200.000	LF	\$17.0000	\$3,400.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0141	3150000000-N	25.000	EA	\$35.0000	\$875.00
	ADDITIONAL GUARDRAIL POSTS				
0142	3195000000-N	2.000	EA	\$500.0000	\$1,000.00
	GUARDRAIL END UNITS, TYPE AT-1				
0143	3210000000-N	13.000	EA	\$600.0000	\$7,800.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0144	3287000000-N	37.000	EA	\$2,900.0000	\$107,300.00
	GUARDRAIL END UNITS, TYPE TL-3				
0145	3288000000-N	2.000	EA	\$2,800.0000	\$5,600.00
	GUARDRAIL END UNITS, TYPE TL-2				
0146	3360000000-E	2175.000	LF	\$1.0000	\$2,175.00
	REMOVE EXISTING GUARDRAIL				
0147	3380000000-E	10775.000	LF	\$7.0000	\$75,425.00

TEMPORARY STEEL BEAM GUARDRAIL					
0148	3382000000-E	250.000	LF	\$7.0000	\$1,750.00
TEMPORARY STEEL BEAM GUARDRAIL (SHOP CURVED)					
0149	3389150000-N	40.000	EA	\$2,000.0000	\$80,000.00
TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)					
0150	3563000000-E	7000.000	LF	\$13.0000	\$91,000.00
TEMP *** WOVEN WIRE FENCE, COMPLETE W/POSTS (47")					
0151	3628000000-E	5900.000	TON	\$45.0000	\$265,500.00
RIP RAP, CLASS I					
0152	3635000000-E	50.000	TON	\$63.0000	\$3,150.00
RIP RAP, CLASS II					
0153	3649000000-E	3470.000	TON	\$43.0000	\$149,210.00
RIP RAP, CLASS B					
0154	3656000000-E	20120.000	SY	\$1.8500	\$37,222.00
GEOTEXTILE FOR DRAINAGE					
0155	4048000000-E	1.000	CY	\$10.0000	\$10.00
REINFORCED CONCRETE SIGN FOUN-DATIONS					
0156	4054000000-E	2.000	CY	\$10.0000	\$20.00
PLAIN CONCRETE SIGN FOUNDA- TIONS					
0157	4060000000-E	1472.000	LB	\$7.0000	\$10,304.00
SUPPORTS, BREAKAWAY STEEL BEAM					
0158	4066000000-E	1216.000	LB	\$6.0000	\$7,296.00
SUPPORTS, SIMPLE STEEL BEAM					
0159	4072000000-E	7085.000	LF	\$8.0000	\$56,680.00
SUPPORTS, 3-LB STEEL U-CHANNEL					
0160	4096000000-N	21.000	EA	\$125.0000	\$2,625.00
SIGN ERECTION, TYPE D					
0161	4102000000-N	336.000	EA	\$75.0000	\$25,200.00
SIGN ERECTION, TYPE E					
0162	4108000000-N	56.000	EA	\$125.0000	\$7,000.00
SIGN ERECTION, TYPE F					
0163	4110000000-N	6.000	EA	\$900.0000	\$5,400.00
SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)					
0164	4110000000-N	3.000	EA	\$500.0000	\$1,500.00
SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)					
0165	4155000000-N	209.000	EA	\$1.0000	\$209.00
DISPOSAL OF SIGN SYSTEM, U- CHANNEL					
0166	4238000000-N	9.000	EA	\$1.0000	\$9.00
DISPOSAL OF SIGN, D, E OR F					
0167	4400000000-E	3046.000	SF	\$10.0000	\$30,460.00
WORK ZONE SIGNS (STATIONARY)					
0168	4405000000-E	1701.000	SF	\$9.0000	\$15,309.00
WORK ZONE SIGNS (PORTABLE)					
0169	4410000000-E	1706.000	SF	\$9.0000	\$15,354.00
WORK ZONE SIGNS (BARRICADE MOUNTED)					
0170	4415000000-N	2.000	EA	\$4,985.7200	\$9,971.44
FLASHING ARROW BOARD					
0171	4420000000-N	2.000	EA	\$18,536.6300	\$37,073.26
PORTABLE CHANGEABLE MESSAGE SIGN					

0172	4430000000-N	2000.000	EA	\$31.9600	\$63,920.00
	DRUMS				
0173	4435000000-N	300.000	EA	\$23.0100	\$6,903.00
	CONES				
0174	4445000000-E	1168.000	LF	\$28.0000	\$32,704.00
	BARRICADES (TYPE III)				
0175	4455000000-N	976.000	DAY	\$269.1300	\$262,670.88
	FLAGGER				
0176	4465000000-N	20.000	EA	\$9,750.0000	\$195,000.00
	TEMPORARY CRASH CUSHIONS				
0177	4470000000-N	9.000	EA	\$2,750.0000	\$24,750.00
	REMOVE & RESET TEMPORARY CRASH CUSHION				
0178	4480000000-N	2.000	EA	\$34,516.4800	\$69,032.96
	TMA				
0179	4485000000-E	4410.000	LF	\$34.0500	\$150,160.50
	PORTABLE CONCRETE BARRIER				
0180	4500000000-E	2860.000	LF	\$6.9500	\$19,877.00
	REMOVE & RESET PORTABLE CONC- RETE BARRIER				
0181	4510000000-N	120.000	HR	\$50.0000	\$6,000.00
	LAW ENFORCEMENT				
0182	4516000000-N	400.000	EA	\$38.3500	\$15,340.00
	SKINNY DRUM				
0183	4650000000-N	3847.000	EA	\$4.0000	\$15,388.00
	TEMPORARY RAISED PAVEMENT MARKERS				
0184	4685000000-E	193643.000	LF	\$0.7400	\$143,295.82
	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)				
0185	4695000000-E	29927.000	LF	\$1.6000	\$47,883.20
	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)				
0186	4700000000-E	2075.000	LF	\$3.0000	\$6,225.00
	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)				
0187	4720000000-E	4.000	EA	\$200.0000	\$800.00
	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)				
0188	4725000000-E	377.000	EA	\$85.0000	\$32,045.00
	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)				
0189	4770000000-E	5317.000	LF	\$8.0000	\$42,536.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)				
0190	4770000000-E	6750.000	LF	\$3.0000	\$20,250.00
	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)				
0191	4810000000-E	802500.000	LF	\$0.1800	\$144,450.00
	PAINT PAVEMENT MARKING LINES (4")				
0192	4820000000-E	13022.000	LF	\$0.5000	\$6,511.00
	PAINT PAVEMENT MARKING LINES (8")				
0193	4825000000-E	360.000	LF	\$1.0000	\$360.00
	PAINT PAVEMENT MARKING LINES (12")				
0194	4835000000-E	4122.000	LF	\$2.0000	\$8,244.00
	PAINT PAVEMENT MARKING LINES (24")				
0195	4840000000-N	16.000	EA	\$75.0000	\$1,200.00
	PAINT PAVEMENT MARKING CHARACTER				
0196	4845000000-N	382.000	EA	\$25.0000	\$9,550.00

PAINT PAVEMENT MARKING SYMBOL					
0197	4850000000-E	90916.000	LF	\$1.0000	\$90,916.00
	REMOVAL OF PAVEMENT MARKING LINES (4")				
0198	4860000000-E	1060.000	LF	\$2.0000	\$2,120.00
	REMOVAL OF PAVEMENT MARKING LINES (8")				
0199	4865000000-E	45.000	LF	\$4.0000	\$180.00
	REMOVAL OF PAVEMENT MARKING LINES (12")				
0200	4870000000-E	602.000	LF	\$6.0000	\$3,612.00
	REMOVAL OF PAVEMENT MARKING LINES (24")				
0201	4875000000-N	55.000	EA	\$100.0000	\$5,500.00
	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS				
0202	4891000000-E	740.000	LF	\$5.5000	\$4,070.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0203	4900000000-N	8.000	EA	\$15.0000	\$120.00
	PERMANENT RAISED PAVEMENT MARKERS				
0204	4905000000-N	3070.000	EA	\$52.0000	\$159,640.00
	SNOWPLOWABLE PAVEMENT MARKERS				
0205	5325200000-E	1378.000	LF	\$31.7500	\$43,751.50
	2" WATER LINE				
0206	5325600000-E	1768.000	LF	\$64.5800	\$114,177.44
	6" WATER LINE				
0207	5325800000-E	3922.000	LF	\$58.5100	\$229,476.22
	8" WATER LINE				
0208	5326000000-E	167.000	LF	\$82.7800	\$13,824.26
	10" WATER LINE				
0209	5326200000-E	39165.000	LF	\$60.0400	\$2,351,466.60
	12" WATER LINE				
0210	5329000000-E	61285.000	LB	\$8.2500	\$505,601.25
	DUCTILE IRON WATER PIPE FITTINGS				
0211	5536000000-E	6.000	EA	\$925.9400	\$5,555.64
	2" VALVE				
0212	5540000000-E	67.000	EA	\$5,214.3300	\$349,360.11
	6" VALVE				
0213	5546000000-E	34.000	EA	\$5,657.0600	\$192,340.04
	8" VALVE				
0214	5552000000-E	2.000	EA	\$22,357.5500	\$44,715.10
	10" VALVE				
0215	5558000000-E	76.000	EA	\$6,742.2900	\$512,414.04
	12" VALVE				
0216	5571600000-E	1.000	EA	\$5,355.0000	\$5,355.00
	6" TAPPING SLEEVE & VALVE				
0217	5571800000-E	4.000	EA	\$5,742.0700	\$22,968.28
	8" TAPPING SLEEVE & VALVE				
0218	5572000000-E	1.000	EA	\$9,570.1100	\$9,570.11
	10" TAPPING SLEEVE & VALVE				
0219	5606000000-E	3.000	EA	\$1,468.3700	\$4,405.11
	2" BLOW OFF				
0220	5643000000-E	5.000	EA	\$1,404.4500	\$7,022.25
	**" WATER METER (1")				

0221	5643100000-E	88.000	EA	\$1,020.9300	\$89,841.84
	3/4" WATER METER				
0222	5643200000-E	3.000	EA	\$2,874.6000	\$8,623.80
	2" WATER METER				
0223	5648000000-N	12.000	EA	\$509.5700	\$6,114.84
	RELOCATE WATER METER				
0224	5649000000-N	28.000	EA	\$509.5800	\$14,268.24
	RECONNECT WATER METER				
0225	5656000000-E	3.000	EA	\$2,881.0500	\$8,643.15
	*** RPZ BACKFLOW PREVENTION ASSEMBLY (1")				
0226	5656000000-E	1.000	EA	\$2,435.4000	\$2,435.40
	*** RPZ BACKFLOW PREVENTION ASSEMBLY (3/4")				
0227	5656200000-E	3.000	EA	\$4,511.8900	\$13,535.67
	2" RPZ BACKFLOW PREVENTION ASSEMBLY				
0228	5666000000-N	29.000	EA	\$2,810.6700	\$81,509.43
	FIRE HYDRANT				
0229	5672000000-N	3.000	EA	\$2,810.6800	\$8,432.04
	RELOCATE FIRE HYDRANT				
0230	5673000000-E	335.000	LF	\$29.5700	\$9,905.95
	FIRE HYDRANT LEG				
0231	5686500000-E	10168.000	LF	\$32.8800	\$334,323.84
	WATER SERVICE LINE				
0232	5691300000-E	1904.000	LF	\$99.5500	\$189,543.20
	8" SANITARY GRAVITY SEWER				
0233	5691400000-E	4316.000	LF	\$90.4100	\$390,209.56
	10" SANITARY GRAVITY SEWER				
0234	5691500000-E	1916.000	LF	\$121.9700	\$233,694.52
	12" SANITARY GRAVITY SEWER				
0235	5709200000-E	1319.000	LF	\$28.0000	\$36,932.00
	4" FORCE MAIN SEWER				
0236	5709600000-E	865.000	LF	\$135.8100	\$117,475.65
	12" FORCE MAIN SEWER				
0237	5768000000-N	29.000	EA	\$577.3800	\$16,744.02
	SANITARY SEWER CLEAN-OUT				
0238	5768500000-E	1993.000	LF	\$38.8900	\$77,507.77
	SEWER SERVICE LINE				
0239	5769000000-E	4085.000	LB	\$7.9500	\$32,475.75
	DUCTILE IRON SEWER PIPE FITTINGS				
0240	5773000000-N	1.000	EA	\$126,473.0000	\$126,473.00
	UTILITY VAULT				
0241	5775000000-E	51.000	EA	\$3,883.2200	\$198,044.22
	4' DIA UTILITY MANHOLE				
0242	5781000000-E	189.000	LF	\$369.5200	\$69,839.28
	UTILITY MANHOLE WALL 4' DIA				
0243	5798000000-E	655.000	LF	\$11.1700	\$7,316.35
	ABANDON *** UTILITY PIPE (2")				
0244	5800000000-E	1345.000	LF	\$9.0300	\$12,145.35
	ABANDON 6" UTILITY PIPE				
0245	5801000000-E	9129.000	LF	\$8.8300	\$80,609.07

	ABANDON 8" UTILITY PIPE				
0246	5802000000-E	4082.000	LF	\$10.9900	\$44,861.18
	ABANDON 10" UTILITY PIPE				
0247	5804000000-E	36003.000	LF	\$16.6900	\$600,890.07
	ABANDON 12" UTILITY PIPE				
0248	5815000000-N	97.000	EA	\$413.7000	\$40,128.90
	REMOVE WATER METER				
0249	5815500000-N	29.000	EA	\$413.7000	\$11,997.30
	REMOVE FIRE HYDRANT				
0250	5828000000-N	36.000	EA	\$612.4000	\$22,046.40
	REMOVE UTILITY MANHOLE				
0251	5835700000-E	120.000	LF	\$58.0000	\$6,960.00
	16" ENCASEMENT PIPE				
0252	5835900000-E	40.000	LF	\$70.0000	\$2,800.00
	20" ENCASEMENT PIPE				
0253	5836000000-E	280.000	LF	\$97.0000	\$27,160.00
	24" ENCASEMENT PIPE				
0254	5872500000-E	120.000	LF	\$711.4100	\$85,369.20
	BORE AND JACK OF *** (16")				
0255	5872500000-E	40.000	LF	\$793.4100	\$31,736.40
	BORE AND JACK OF *** (20")				
0256	5872500000-E	280.000	LF	\$788.1000	\$220,668.00
	BORE AND JACK OF *** (24")				
0257	5877000000-N	1.000	LS	\$452,500.0000	\$452,500.00
	SANITARY SEWER PUMP STATION				
0258	6000000000-E	182000.000	LF	\$2.5000	\$455,000.00
	TEMPORARY SILT FENCE				
0259	6006000000-E	4550.000	TON	\$0.0100	\$45.50
	STONE FOR EROSION CONTROL, CLASS A				
0260	6009000000-E	18100.000	TON	\$50.9300	\$921,833.00
	STONE FOR EROSION CONTROL, CLASS B				
0261	6012000000-E	38000.000	TON	\$0.0100	\$380.00
	SEDIMENT CONTROL STONE				
0262	6015000000-E	512.500	ACR	\$600.0000	\$307,500.00
	TEMPORARY MULCHING				
0263	6018000000-E	19500.000	LB	\$2.0000	\$39,000.00
	SEED FOR TEMPORARY SEEDING				
0264	6021000000-E	97.500	TON	\$850.0000	\$82,875.00
	FERTILIZER FOR TEMPORARY SEED-ING				
0265	6024000000-E	1810.000	LF	\$13.0200	\$23,566.20
	TEMPORARY SLOPE DRAINS				
0266	6029000000-E	10400.000	LF	\$2.5000	\$26,000.00
	SAFETY FENCE				
0267	6030000000-E	30930.000	CY	\$3.5000	\$108,255.00
	SILT EXCAVATION				
0268	6036000000-E	220000.000	SY	\$1.3500	\$297,000.00
	MATting FOR EROSION CONTROL				
0269	6037000000-E	100.000	SY	\$4.5000	\$450.00
	COIR FIBER MAT				

0270	6038000000-E	2030.000	SY	\$5.5000	\$11,165.00
	PERMANENT SOIL REINFORCEMENT MAT				
0271	6042000000-E	31280.000	LF	\$8.0000	\$250,240.00
	1/4" HARDWARE CLOTH				
0272	6045000000-E	36.000	LF	\$50.3000	\$1,810.80
	*** TEMPORARY PIPE (15")				
0273	6045000000-E	40.000	LF	\$62.7300	\$2,509.20
	*** TEMPORARY PIPE (18")				
0274	6045000000-E	1320.000	LF	\$51.2500	\$67,650.00
	*** TEMPORARY PIPE (24")				
0275	6045000000-E	56.000	LF	\$77.5500	\$4,342.80
	*** TEMPORARY PIPE (30")				
0276	6045000000-E	80.000	LF	\$68.8900	\$5,511.20
	*** TEMPORARY PIPE (36")				
0277	6045000000-E	134.000	LF	\$87.3300	\$11,702.22
	*** TEMPORARY PIPE (42")				
0278	6045000000-E	2300.000	LF	\$88.6500	\$203,895.00
	*** TEMPORARY PIPE (48")				
0279	6045000000-E	40.000	LF	\$153.0500	\$6,122.00
	*** TEMPORARY PIPE (54")				
0280	6045000000-E	40.000	LF	\$175.7200	\$7,028.80
	*** TEMPORARY PIPE (60")				
0281	6046000000-E	275.000	LF	\$73.5500	\$20,226.25
	TEMPORARY PIPE FOR STREAM CROSSING				
0282	6048000000-E	1670.000	SY	\$25.7800	\$43,052.60
	FLOATING TURBIDITY CURTAIN				
0283	6070000000-N	50.000	EA	\$439.8900	\$21,994.50
	SPECIAL STILLING BASINS				
0284	6071012000-E	3700.000	LF	\$12.0000	\$44,400.00
	COIR FIBER WATTLE				
0285	6071014000-E	530.000	LF	\$18.0000	\$9,540.00
	COIR FIBER WATTLE BARRIER				
0286	6071020000-E	3300.000	LB	\$10.0000	\$33,000.00
	POLYACRYLAMIDE (PAM)				
0287	6071030000-E	2000.000	LF	\$9.0000	\$18,000.00
	COIR FIBER BAFFLE				
0288	6071050000-E	51.000	EA	\$1,050.1200	\$53,556.12
	*** SKIMMER (1-1/2")				
0289	6071050000-E	6.000	EA	\$1,165.1800	\$6,991.08
	*** SKIMMER (2")				
0290	6071050000-E	1.000	EA	\$2,053.6500	\$2,053.65
	*** SKIMMER (4")				
0291	6084000000-E	273.000	ACR	\$1,600.0000	\$436,800.00
	SEEDING & MULCHING				
0292	6087000000-E	321.000	ACR	\$85.0000	\$27,285.00
	MOWING				
0293	6090000000-E	5200.000	LB	\$3.5000	\$18,200.00
	SEED FOR REPAIR SEEDING				
0294	6093000000-E	13.750	TON	\$950.0000	\$13,062.50

FERTILIZER FOR REPAIR SEEDING					
0295	6096000000-E	6825.000	LB	\$3.5000	\$23,887.50
SEED FOR SUPPLEMENTAL SEEDING					
0296	6108000000-E	205.000	TON	\$750.0000	\$153,750.00
FERTILIZER TOPDRESSING					
0297	6111000000-E	450.000	LF	\$68.2400	\$30,708.00
IMPERVIOUS DIKE					
0298	6114500000-N	10.000	MHR	\$95.0000	\$950.00
SPECIALIZED HAND MOWING					
0299	6117000000-N	150.000	EA	\$250.0000	\$37,500.00
RESPONSE FOR EROSION CONTROL					
0300	6117500000-N	10.000	EA	\$1,212.1600	\$12,121.60
CONCRETE WASHOUT STRUCTURE					
0301	6132000000-N	8.000	EA	\$222.5600	\$1,780.48
GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE					
0302	6132000000-N	16.000	EA	\$222.5600	\$3,560.96
GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT					
0303	6141000000-E	2045.000	SY	\$4.9600	\$10,143.20
GENERIC EROSION CONTROL ITEM IMPERVIOUS PLASTIC					
0304	7048500000-E	8.000	EA	\$1,200.0000	\$9,600.00
PEDESTRIAN SIGNAL HEAD (16", 1SECTION W/COUNTDOWN)					
0305	7060000000-E	5050.000	LF	\$4.5000	\$22,725.00
SIGNAL CABLE					
0306	7120000000-E	27.000	EA	\$750.0000	\$20,250.00
VEHICLE SIGNAL HEAD (12", 3 SECTION)					
0307	7144000000-E	7.000	EA	\$1,050.0000	\$7,350.00
VEHICLE SIGNAL HEAD (12", 5 SECTION)					
0308	7252000000-E	560.000	LF	\$3.5000	\$1,960.00
MESSENGER CABLE (1/4")					
0309	7264000000-E	1550.000	LF	\$4.2500	\$6,587.50
MESSENGER CABLE (3/8")					
0310	7300000000-E	1300.000	LF	\$7.0000	\$9,100.00
UNPAVED TRENCHING (*****) (1, 2")					
0311	7300000000-E	240.000	LF	\$7.8000	\$1,872.00
UNPAVED TRENCHING (*****) (2, 2")					
0312	7300000000-E	75.000	LF	\$10.0000	\$750.00
UNPAVED TRENCHING (*****) (4, 2")					
0313	7301000000-E	170.000	LF	\$27.0000	\$4,590.00
DIRECTIONAL DRILL (*****) (1, 2")					
0314	7324000000-N	23.000	EA	\$300.0000	\$6,900.00
JUNCTION BOX (STANDARD SIZE)					
0315	7348000000-N	3.000	EA	\$625.0000	\$1,875.00
JUNCTION BOX (OVER-SIZED, HEA-VY DUTY)					
0316	7360000000-N	2.000	EA	\$1,250.0000	\$2,500.00
WOOD POLE					
0317	7372000000-N	8.000	EA	\$375.0000	\$3,000.00
GUY ASSEMBLY					
0318	7408000000-E	1.000	EA	\$300.0000	\$300.00
1" RISER WITH WEATHERHEAD					

0319	7420000000-E	2.000	EA	\$425.0000	\$850.00
	2" RISER WITH WEATHERHEAD				
0320	7432000000-E	1.000	EA	\$450.0000	\$450.00
	2" RISER WITH HEAT SHRINK TUBING				
0321	7444000000-E	3150.000	LF	\$5.6500	\$17,797.50
	INDUCTIVE LOOP SAWCUT				
0322	7456000000-E	10700.000	LF	\$2.2500	\$24,075.00
	LEAD-IN CABLE (***** (14-2)				
0323	7481000000-N	2.000	EA	\$1,500.0000	\$3,000.00
	SITE SURVEY				
0324	7481200000-N	7.000	EA	\$800.0000	\$5,600.00
	LUMINAIRE ARM FOR VIDEO SYSTEM				
0325	7481240000-N	7.000	EA	\$2,800.0000	\$19,600.00
	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT				
0326	7481260000-N	2.000	EA	\$6,250.0000	\$12,500.00
	EXTERNAL LOOP EMULATOR PRO-CESSING UNIT				
0327	7481280000-N	8.000	EA	\$1,200.0000	\$9,600.00
	RELOCATE CAMERA SENSOR UNIT				
0328	7528000000-E	600.000	LF	\$6.0000	\$3,600.00
	DROP CABLE				
0329	7540000000-N	1.000	EA	\$2,100.0000	\$2,100.00
	SPLICE ENCLOSURE				
0330	7541000000-N	1.000	EA	\$1,800.0000	\$1,800.00
	MODIFY SPLICE ENCLOSURE				
0331	7552000000-N	1.000	EA	\$2,100.0000	\$2,100.00
	INTERCONNECT CENTER				
0332	7576000000-N	4.000	EA	\$11,500.0000	\$46,000.00
	METAL STRAIN SIGNAL POLE				
0333	7613000000-N	4.000	EA	\$950.0000	\$3,800.00
	SOIL TEST				
0334	7614100000-E	24.000	CY	\$850.0000	\$20,400.00
	DRILLED PIER FOUNDATION				
0335	7636000000-N	10.000	EA	\$500.0000	\$5,000.00
	SIGN FOR SIGNALS				
0336	7642200000-N	8.000	EA	\$2,200.0000	\$17,600.00
	TYPE II PEDESTAL WITH FOUND-ATION				
0337	7684000000-N	1.000	EA	\$850.0000	\$850.00
	SIGNAL CABINET FOUNDATION				
0338	7696000000-N	1.000	EA	\$15,000.0000	\$15,000.00
	CONTROLLERS WITH CABINET (***** (2070E, BASE MOUNTED)				
0339	7744000000-N	13.000	EA	\$125.0000	\$1,625.00
	DETECTOR CARD (TYPE 170)				
0340	7901000000-N	1.000	EA	\$375.0000	\$375.00
	CABINET BASE EXTENDER				
0341	7990000000-E	200.000	LF	\$2.0000	\$400.00
	GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE				
0360	1209000000-E	35430.000	GAL	\$3.3500	\$118,690.50
	ASPHALT CURING SEAL				

Section 0001 Total \$61,941,297.84

Section 0002
CULVERT ITEMS

0342	8056000000-N	1.000 LS	\$19,516.3200	\$19,516.32
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (24+95.00 -Y2-)			
0343	8056000000-N	1.000 LS	\$58,000.0000	\$58,000.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (305+27.00 -L-)			
0344	8056000000-N	1.000 LS	\$58,000.0000	\$58,000.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (363+00.00 -L-)			
0345	8056000000-N	1.000 LS	\$19,507.9600	\$19,507.96
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (38+76.00 -L-)			
0346	8056000000-N	1.000 LS	\$58,000.0000	\$58,000.00
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (381+64.00 -L-)			
0347	8056000000-N	1.000 LS	\$20,130.4300	\$20,130.43
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (53+01.00 -L-)			
0348	8056000000-N	1.000 LS	\$19,580.8400	\$19,580.84
	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (93+58.00 -L-)			
0349	8126000000-N	1.000 LS	\$15,770.7700	\$15,770.77
	CULVERT EXCAVATION, STA ***** (24+95.00 -Y2-)			
0350	8126000000-N	1.000 LS	\$46,000.0000	\$46,000.00
	CULVERT EXCAVATION, STA ***** (305+27.00 -L-)			
0351	8126000000-N	1.000 LS	\$46,000.0000	\$46,000.00
	CULVERT EXCAVATION, STA ***** (363+00.00 -L-)			
0352	8126000000-N	1.000 LS	\$21,027.6900	\$21,027.69
	CULVERT EXCAVATION, STA ***** (38+76.00 -L-)			
0353	8126000000-N	1.000 LS	\$46,000.0000	\$46,000.00
	CULVERT EXCAVATION, STA ***** (381+64.00 -L-)			
0354	8126000000-N	1.000 LS	\$18,712.2500	\$18,712.25
	CULVERT EXCAVATION, STA ***** (53+01.00 -L-)			
0355	8126000000-N	1.000 LS	\$15,593.9400	\$15,593.94
	CULVERT EXCAVATION, STA ***** (93+58.00 -L-)			
0356	8133000000-E	1422.000 TON	\$50.1300	\$71,284.86
	FOUNDATION CONDITIONING MATER-IAL, BOX CULVERT			
0357	8196000000-E	2349.600 CY	\$773.7300	\$1,817,956.01
	CLASS A CONCRETE (CULVERT)			
0358	8245000000-E	325427.000 LB	\$1.5700	\$510,920.39
	REINFORCING STEEL (CULVERT)			

Section 0002 Total \$2,862,001.46

Section 0003
WALL ITEMS

0359	8802040000-E	380.000 SF	\$140.0000	\$53,200.00
	CIP GRAVITY RETAINING WALLS			

Section 0003 Total \$53,200.00

Item Total	\$64,856,499.30
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ELECTRONIC BID SUBMISSION

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

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NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION

The prequalified bidder declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating N.C.G.S. §133-24 within the last three years, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. §133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.
2. The terms covered transaction, debarred, suspended, ineligible, lower tier

covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.

3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.

4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal- Aid Provision titled Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273) provided by the Department, without subsequent modification, in all lower tier covered transactions.

5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.

6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or

commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and

d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

EXPLANATION:

=====

Award Limits on Multiple Projects

By answering YES to this statement, the bidder acknowledges that they are using the award limits on multiple projects? **Yes** ☐ **No** ☒

A bidder who desires to bid on more than one project on which bids are to be opened on the same date, and who also desires to avoid receiving an award of more projects than he is equipped to handle, may bid on any number of projects but may limit the total amount of work awarded to him on selected projects by completing the AWARD LIMITS ON MULTIPLE PROJECTS.

The Award Limits on Multiple Projects must be filled in on each project bid for which the Bidder desires protection.

It is the desire of the Bidder to be awarded contracts, the value of which will not exceed a total of for those

projects indicated herein, for which bids will be opened on (MM/DD/YY)

The Award Limits shall apply to the following projects:

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

Contract Number
County

It is agreed that if I am (we are) the low Bidder(s) on indicated projects, the total value of which is more than the above stipulated award limits, the Board of Transportation will award me (us) projects from among those indicated

that have a total value not to exceed the award limit and will result in the lowest total bids to the Department of Transportation.

DBE List Summary

Project: STATE FUNDED

Bidder ID: 3740

Bid Total: 64,856,499.30

Business Name: Blythe Development Company

Goal: 11.00% (7,134,214.92)

Total Entered: 11.03% (7,155,072.52)

ID	Name	Is Supplier?	Item Count	Amount	Is Complete?
8233	GROUND EFFECTS INC	False	23	809,896.02	True
11883	JC CONCRETE CONSTRUCTION LLC	False	12	1,812,995.00	True
12802	NICKELSTON INDUSTRIES INC	False	12	535,125.00	True
4417	POZZOLANIC CONTRACTING & SUPPLY CO INC	False	6	1,744,945.50	True
4247	SEAL BROTHERS CONTRACTING LLC	False	7	840,680.00	True
10201	DS TRUCKING SERVICE INC	False	5	602,913.00	True
2273	CHAMBERS EXPRESS TRUCKING INC	False	3	610,000.00	True
4761	TRAFFIC CONTROL SAFETY SERVICES, INC.	False	16	198,518.00	True

Name: GROUND EFFECTS INC ID: 8233

Address: P.O. BOX 2440 , MATTHEWS, NC 28106

Used As: SubContractor DBE Items Total:\$809,896.02

Items for GROUND EFFECTS INC

0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0001	0000100000-N	1.000	LS	\$65,000.0000	\$65,000.00
MOBILIZATION					
Note: partial					
0183	4650000000-N	3847.000	EA	\$4.0000	\$15,388.00
TEMPORARY RAISED PAVEMENT MARKERS					
0184	4685000000-E	193643.000	LF	\$0.7400	\$143,295.82
THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)					
0185	4695000000-E	29927.000	LF	\$1.6000	\$47,883.20
THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)					
0186	4700000000-E	2075.000	LF	\$3.0000	\$6,225.00
THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)					
0187	4720000000-E	4.000	EA	\$200.0000	\$800.00
THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)					
0188	4725000000-E	377.000	EA	\$85.0000	\$32,045.00
THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)					
0189	4770000000-E	5317.000	LF	\$8.0000	\$42,536.00
COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)					
0190	4770000000-E	6750.000	LF	\$3.0000	\$20,250.00
COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)					
0191	4810000000-E	802500.000	LF	\$0.1800	\$144,450.00
PAINT PAVEMENT MARKING LINES (4")					
0192	4820000000-E	13022.000	LF	\$0.5000	\$6,511.00
PAINT PAVEMENT MARKING LINES (8")					
0193	4825000000-E	360.000	LF	\$1.0000	\$360.00
PAINT PAVEMENT MARKING LINES (12")					
0194	4835000000-E	4122.000	LF	\$2.0000	\$8,244.00
PAINT PAVEMENT MARKING LINES (24")					
0195	4840000000-N	16.000	EA	\$75.0000	\$1,200.00
PAINT PAVEMENT MARKING CHARACTER					
0196	4845000000-N	382.000	EA	\$25.0000	\$9,550.00
PAINT PAVEMENT MARKING SYMBOL					
0197	4850000000-E	90916.000	LF	\$1.0000	\$90,916.00
REMOVAL OF PAVEMENT MARKING LINES (4")					
0198	4860000000-E	1060.000	LF	\$2.0000	\$2,120.00
REMOVAL OF PAVEMENT MARKING LINES (8")					
0199	4865000000-E	45.000	LF	\$4.0000	\$180.00
REMOVAL OF PAVEMENT MARKING LINES (12")					

0200	4870000000-E	602.000	LF	\$6.0000	\$3,612.00
	REMOVAL OF PAVEMENT MARKING LINES (24")				
0201	4875000000-N	55.000	EA	\$100.0000	\$5,500.00
	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS				
0202	4891000000-E	740.000	LF	\$5.5000	\$4,070.00
	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)				
0203	4900000000-N	8.000	EA	\$15.0000	\$120.00
	PERMANENT RAISED PAVEMENT MARKERS				
0204	4905000000-N	3070.000	EA	\$52.0000	\$159,640.00
	SNOWFLOWABLE PAVEMENT MARKERS				
Section 0001 Total					\$809,896.02
Item Total					\$809,896.02

Name: JC CONCRETE CONSTRUCTION LLC ID: 11883

Address: P.O. BOX 613 , PINNACLE, NC 27043

Used As: SubContractor DBE Items Total:\$1,812,995.00

Items for JC CONCRETE CONSTRUCTION LLC

0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0123	2535000000-E	335.000	LF	\$20.0000	\$6,700.00
***X *** CONCRETE CURB (8" X 18")					
0124	2538000000-E	180.000	LF	\$20.0000	\$3,600.00
'- CONCRETE CURB & GUTTER (2'-0")					
0125	2542000000-E	6980.000	LF	\$17.0000	\$118,660.00
1'-6" CONCRETE CURB & GUTTER					
0126	2549000000-E	20350.000	LF	\$19.0000	\$386,650.00
2'-6" CONCRETE CURB & GUTTER					
0127	2556000000-E	5270.000	LF	\$23.0000	\$121,210.00
SHOULDER BERM GUTTER					
0128	2570000000-N	2.000	EA	\$1,600.0000	\$3,200.00
MODIFIED CONCRETE FLUME					
0129	2591000000-E	7840.000	SY	\$40.0000	\$313,600.00
4" CONCRETE SIDEWALK					
0130	2605000000-N	70.000	EA	\$1,700.0000	\$119,000.00
CONCRETE CURB RAMPS					
0131	2612000000-E	2240.000	SY	\$50.0000	\$112,000.00
6" CONCRETE DRIVEWAY					
0132	2619000000-E	33.000	SY	\$45.0000	\$1,485.00
4" CONCRETE PAVED DITCH					
0133	2655000000-E	11050.000	SY	\$55.0000	\$607,750.00
5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)					
0134	2657000000-E	330.000	SY	\$58.0000	\$19,140.00
*** MONOLITHIC CONCRETE MEDIAN (*****) (5", KEYED IN)					
Section 0001 Total					\$1,812,995.00
Item Total					\$1,812,995.00

Name: NICKELSTON INDUSTRIES INC ID: 12802

Address: POST OFFICE BOX 133 , LAWSONVILLE, NC 27022

Used As: SubContractor DBE Items Total:\$535,125.00

Items for NICKELSTON INDUSTRIES INC

0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0139	3030000000-E	9925.000	LF	\$16.0000	\$158,800.00
	STEEL BEAM GUARDRAIL				
0140	3045000000-E	200.000	LF	\$17.0000	\$3,400.00
	STEEL BEAM GUARDRAIL, SHOP CURVED				
0141	3150000000-N	25.000	EA	\$35.0000	\$875.00
	ADDITIONAL GUARDRAIL POSTS				
0142	3195000000-N	2.000	EA	\$500.0000	\$1,000.00
	GUARDRAIL END UNITS, TYPE AT-1				
0143	3210000000-N	13.000	EA	\$600.0000	\$7,800.00
	GUARDRAIL END UNITS, TYPE CAT-1				
0144	3287000000-N	37.000	EA	\$2,900.0000	\$107,300.00
	GUARDRAIL END UNITS, TYPE TL-3				
0145	3288000000-N	2.000	EA	\$2,800.0000	\$5,600.00
	GUARDRAIL END UNITS, TYPE TL-2				
0146	3360000000-E	2175.000	LF	\$1.0000	\$2,175.00
	REMOVE EXISTING GUARDRAIL				
0147	3380000000-E	10775.000	LF	\$7.0000	\$75,425.00
	TEMPORARY STEEL BEAM GUARDRAIL				
0148	3382000000-E	250.000	LF	\$7.0000	\$1,750.00
	TEMPORARY STEEL BEAM GUARDRAIL (SHOP CURVED)				
0149	3389150000-N	40.000	EA	\$2,000.0000	\$80,000.00
	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)				
0150	3563000000-E	7000.000	LF	\$13.0000	\$91,000.00
	TEMP *** WOVEN WIRE FENCE, COMPLETE W/POSTS (47")				
Section 0001 Total					\$535,125.00
Item Total					\$535,125.00

Name: POZZOLANIC CONTRACTING & SUPPLY CO INC ID: 4417

Address: 2401 ASBURY ROAD , KNOXVILLE, TN 379146408

Used As: SubContractor DBE Items Total:\$1,744,945.50

Items for POZZOLANIC CONTRACTING & SUPPLY CO INC

0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0001	0000100000-N	1.000	LS	\$72,000.0000	\$72,000.00
MOBILIZATION					
Note: Partial- Multiple Mobilizations					
0070	1044000000-E	118100.000	SY	\$2.6500	\$312,965.00
LIME TREATED SOIL (SLURRY METHOD)					
0071	1066000000-E	1420.000	TON	\$228.0000	\$323,760.00
LIME FOR LIME TREATED SOIL					
0077	1176000000-E	118100.000	SY	\$2.5000	\$295,250.00
SOIL CEMENT BASE					
0078	1187000000-E	3310.000	TON	\$188.0000	\$622,280.00
PORTLAND CEMENT FOR SOIL CEMENT BASE					
0360	1209000000-E	35430.000	GAL	\$3.3500	\$118,690.50
ASPHALT CURING SEAL					
Section 0001 Total					\$1,744,945.50
Item Total					\$1,744,945.50

Name: SEAL BROTHERS CONTRACTING LLC ID: 4247

Address: 131 W. CLEVE STREET , MOUNT AIRY, NC 27030

Used As: SubContractor DBE Items Total:\$840,680.00

Items for SEAL BROTHERS CONTRACTING LLC

0001					
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0258	6000000000-E	182000.000	LF	\$2.5000	\$455,000.00
TEMPORARY SILT FENCE					
0266	6029000000-E	10400.000	LF	\$2.5000	\$26,000.00
SAFETY FENCE					
0271	6042000000-E	31280.000	LF	\$8.0000	\$250,240.00
1/4" HARDWARE CLOTH					
0284	6071012000-E	3700.000	LF	\$12.0000	\$44,400.00
COIR FIBER WATTLE					
0285	6071014000-E	530.000	LF	\$18.0000	\$9,540.00
COIR FIBER WATTLE BARRIER					
0287	6071030000-E	2000.000	LF	\$9.0000	\$18,000.00
COIR FIBER BAFFLE					
0299	6117000000-N	150.000	EA	\$250.0000	\$37,500.00
RESPONSE FOR EROSION CONTROL					
Section 0001 Total					\$840,680.00
Item Total					\$840,680.00

Name: DS TRUCKING SERVICE INC ID: 10201

Address: PO BOX 1404 , INDIAN TRAIL, NC 28079

Used As: SubContractor DBE Items Total:\$602,913.00

Items for DS TRUCKING SERVICE INC

0001 ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)				
0003	0001000000-E	1.000 LS	\$40,000.0000	\$40,000.00
CLEARING & GRUBBING .. ACRE(S)				
Note: Misc Hauling -500 hrs @ \$80/ hr				
0006	0022000000-E	477000.000 CY	\$0.9500	\$453,150.00
UNCLASSIFIED EXCAVATION				
Note: Partial- 5664.375 hrs @ \$80/ hr				
0015	0194000000-E	5000.000 CY	\$9.5400	\$47,700.00
SELECT GRANULAR MATERIAL, CLASS III				
Note: Partial 9000 tons @ \$5.30/ ton				
0076	1121000000-E	6710.000 TON	\$5.3000	\$35,563.00
AGGREGATE BASE COURSE				
Note: Haul Only				
0080	1220000000-E	5000.000 TON	\$5.3000	\$26,500.00
INCIDENTAL STONE BASE				
Note: haul only				
Section 0001 Total				\$602,913.00
Item Total				\$602,913.00

Letting: L191015
10/15/2019 02:00:00 PM

North Carolina Department of Transportation
3740 - Blythe Development Company

Contract ID: C204181
Call: 002

Name: CHAMBERS EXPRESS TRUCKING INC ID: 2273

Address: 2132 BLUE BONNETT LANE , MATTHEWS, NC 28105

Used As: SubContractor DBE Items Total:\$610,000.00

Items for CHAMBERS EXPRESS TRUCKING INC

0001				
ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)				
0084	1491000000-E	42000.000 TON	\$5.0000	\$210,000.00
ASPHALT CONC BASE COURSE, TYPE B25.0C				
Note: Haul Only				
0085	1503000000-E	40000 TON	\$5.0000	\$200,000.00
ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C				
Note: Partial- Haul Only				
0087	1523000000-E	40000 TON	\$5.0000	\$200,000.00
ASPHALT CONC SURFACE COURSE, TYPE S9.5C				
Note: Partial- Haul Only				
Section 0001 Total				\$610,000.00
Item Total				\$610,000.00

Name: TRAFFIC CONTROL SAFETY SERVICES, INC. ID: 4761

Address: POST OFFICE BOX 24511 , WINSTON-SALEM, NC 27114

Used As: SubContractor DBE Items Total:\$198,518.00

Items for TRAFFIC CONTROL SAFETY SERVICES, INC.

0001 ROADWAY ITEMS - NPAR (CITY OF ALBEMARLE)					
0001	0000100000-N	1.000	LS	\$3,747.0000	\$3,747.00
MOBILIZATION					
Note: partial					
0155	4048000000-E	1.000	CY	\$10.0000	\$10.00
REINFORCED CONCRETE SIGN FOUN-DATIONS					
0156	4054000000-E	2.000	CY	\$10.0000	\$20.00
PLAIN CONCRETE SIGN FOUNDA- TIONS					
0157	4060000000-E	1472.000	LB	\$7.0000	\$10,304.00
SUPPORTS, BREAKAWAY STEEL BEAM					
0158	4066000000-E	1216.000	LB	\$6.0000	\$7,296.00
SUPPORTS, SIMPLE STEEL BEAM					
0159	4072000000-E	7085.000	LF	\$8.0000	\$56,680.00
SUPPORTS, 3-LB STEEL U-CHANNEL					
0160	4096000000-N	21.000	EA	\$125.0000	\$2,625.00
SIGN ERECTION, TYPE D					
0161	4102000000-N	336.000	EA	\$75.0000	\$25,200.00
SIGN ERECTION, TYPE E					
0162	4108000000-N	56.000	EA	\$125.0000	\$7,000.00
SIGN ERECTION, TYPE F					
0163	4110000000-N	6.000	EA	\$900.0000	\$5,400.00
SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)					
0164	4110000000-N	3.000	EA	\$500.0000	\$1,500.00
SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)					
0165	4155000000-N	209.000	EA	\$1.0000	\$209.00
DISPOSAL OF SIGN SYSTEM, U- CHANNEL					
0166	4238000000-N	9.000	EA	\$1.0000	\$9.00
DISPOSAL OF SIGN, D, E OR F					
0167	4400000000-E	3046.000	SF	\$10.0000	\$30,460.00
WORK ZONE SIGNS (STATIONARY)					
0169	4410000000-E	1706.000	SF	\$9.0000	\$15,354.00
WORK ZONE SIGNS (BARRICADE MOUNTED)					
0174	4445000000-E	1168.000	LF	\$28.0000	\$32,704.00
BARRICADES (TYPE III)					
Section 0001 Total					\$198,518.00

Item Total	\$198,518.00
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THIS PROPOSAL CONTAINS THE FOLLOWING ERRORS/WARNINGS (IF ANY)

This Bid contains 2 amendment files

000001 10/02/2019 REMOVE PRE-SPLITTING OF ROCK
000002 10/07/2019 ADD ASPHALT CURING SEAL

Electronic Bid Submission

By submitting this bid electronically, I hereby acknowledge that all requirements included in the hard copy proposal, addendum, amendments, plans, standard specifications, supplemental specifications and special provisions are part of the bid and contract. Further, I acknowledge that I have read, understand, accept, acknowledge and agree to comply with all statements in this electronic bid.

I hereby certify that I have the authority to submit this bid.

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Signature _____

Agency _____

Date _____

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
ROADWAY ITEMS						
0001	0000100000-N	800	MOBILIZATION	Lump Sum LS	3,170,000.00	3,170,000.00
0002	0000400000-N	801	CONSTRUCTION SURVEYING	Lump Sum LS	890,000.00	890,000.00
0003	0001000000-E	200	CLEARING & GRUBBING .. ACRE(S)	Lump Sum LS	6,891,947.00	6,891,947.00
0004	0008000000-E	200	SUPPLEMENTARY CLEARING & GRUB-BING	3 ACR	10,000.00	30,000.00
0005	0015000000-N	205	SEALING ABANDONED WELLS	4 EA	2,426.76	9,707.04
0006	0022000000-E	225	UNCLASSIFIED EXCAVATION	477,000 CY	6.70	3,195,900.00
0007	0036000000-E	225	UNDERCUT EXCAVATION	7,000 CY	15.65	109,550.00
0009	0106000000-E	230	BORROW EXCAVATION	316,000 CY	0.10	31,600.00
0010	0134000000-E	240	DRAINAGE DITCH EXCAVATION	10,500 CY	7.98	83,790.00
0011	0156000000-E	250	REMOVAL OF EXISTING ASPHALT PAVEMENT	72,600 SY	4.19	304,194.00
0012	0163000000-E	250	REMOVAL OF EXISTING CONCRETE PAVEMENT	3,120 SY	7.55	23,556.00
0013	0177000000-E	250	BREAKING OF EXISTING ASPHALT PAVEMENT	23,450 SY	4.03	94,503.50
0014	0192000000-N	260	PROOF ROLLING	30 HR	219.35	6,580.50
0015	0194000000-E	265	SELECT GRANULAR MATERIAL, CLASS III	5,000 CY	32.17	160,850.00
0016	0195000000-E	265	SELECT GRANULAR MATERIAL	11,500 CY	8.40	96,600.00
0017	0196000000-E	270	GEOTEXTILE FOR SOIL STABILIZATION	246,750 SY	1.89	466,357.50
0018	0199000000-E	SP	TEMPORARY SHORING	29,800 SF	49.18	1,465,564.00
0019	0223000000-E	275	ROCK PLATING	375 SY	42.88	16,080.00
0020	0225000000-E	SP	REINFORCED SOIL SLOPES	2,350 SY	215.00	505,250.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0021	0255000000-E	SP	GENERIC GRADING ITEM HAULING AND DISPOSAL OF PETRO- LEUM CONTAMINATED SOIL	500 TON	118.33	59,165.00
0022	0318000000-E	300	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRUCTURES	5,280 TON	35.00	184,800.00
0023	0320000000-E	300	FOUNDATION CONDITIONING GEO- TEXTILE	16,580 SY	2.77	45,926.60
0024	0335000000-E	305	*** DRAINAGE PIPE (4")	60 LF	101.22	6,073.20
0025	0335100000-E	305	12" DRAINAGE PIPE	136 LF	60.75	8,262.00
0026	0335200000-E	305	15" DRAINAGE PIPE	9,644 LF	46.77	451,049.88
0027	0335300000-E	305	18" DRAINAGE PIPE	3,388 LF	50.09	169,704.92
0028	0335400000-E	305	24" DRAINAGE PIPE	1,600 LF	53.89	86,224.00
0029	0335500000-E	305	30" DRAINAGE PIPE	1,828 LF	71.27	130,281.56
0030	0335600000-E	305	36" DRAINAGE PIPE	108 LF	117.41	12,680.28
0031	0335700000-E	305	42" DRAINAGE PIPE	740 LF	140.91	104,273.40
0032	0335800000-E	305	48" DRAINAGE PIPE	348 LF	171.30	59,612.40
0033	0343000000-E	310	15" SIDE DRAIN PIPE	1,152 LF	43.67	50,307.84
0034	0344000000-E	310	18" SIDE DRAIN PIPE	336 LF	53.89	18,107.04
0035	0345000000-E	310	24" SIDE DRAIN PIPE	100 LF	94.43	9,443.00
0036	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (15", V)	276 LF	57.71	15,927.96
0037	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (18", V)	340 LF	68.93	23,436.20
0038	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (30", V)	52 LF	132.55	6,892.60

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0039	0354000000-E	310	**** RC PIPE CULVERTS, CLASS ***** (48", V)	424 LF	188.93	80,106.32
0040	0366000000-E	310	15" RC PIPE CULVERTS, CLASS III	2,816 LF	44.15	124,326.40
0041	0372000000-E	310	18" RC PIPE CULVERTS, CLASS III	2,352 LF	49.69	116,870.88
0042	0378000000-E	310	24" RC PIPE CULVERTS, CLASS III	2,148 LF	63.58	136,569.84
0043	0384000000-E	310	30" RC PIPE CULVERTS, CLASS III	1,148 LF	86.50	99,302.00
0044	0390000000-E	310	36" RC PIPE CULVERTS, CLASS III	1,828 LF	110.45	201,902.60
0045	0396000000-E	310	42" RC PIPE CULVERTS, CLASS III	424 LF	143.17	60,704.08
0046	0402000000-E	310	48" RC PIPE CULVERTS, CLASS III	504 LF	151.00	76,104.00
0047	0414000000-E	310	60" RC PIPE CULVERTS, CLASS III	184 LF	270.00	49,680.00
0048	0420000000-E	310	66" RC PIPE CULVERTS, CLASS III	196 LF	334.00	65,464.00
0049	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (48")	44 LF	170.00	7,480.00
0050	0448000000-E	310	***** RC PIPE CULVERTS, CLASS IV (72")	248 LF	440.00	109,120.00
0051	0448200000-E	310	15" RC PIPE CULVERTS, CLASS IV	8,144 LF	48.00	390,912.00
0052	0448300000-E	310	18" RC PIPE CULVERTS, CLASS IV	3,012 LF	52.23	157,316.76
0053	0448400000-E	310	24" RC PIPE CULVERTS, CLASS IV	1,684 LF	70.00	117,880.00
0054	0448500000-E	310	30" RC PIPE CULVERTS, CLASS IV	1,168 LF	100.00	116,800.00
0055	0448600000-E	310	36" RC PIPE CULVERTS, CLASS IV	656 LF	141.00	92,496.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0056	0448700000-E	310	42" RC PIPE CULVERTS, CLASS IV	1,280 LF	162.00	207,360.00
0057	0536000000-E	310	**** HDPE PIPE CULVERTS (8")	4 LF	85.85	343.40
0058	0576000000-E	310	*** CS PIPE CULVERTS, ***** THICK (36", 0.079")	56 LF	120.38	6,741.28
0059	0582000000-E	310	15" CS PIPE CULVERTS, 0.064" THICK	720 LF	46.57	33,530.40
0060	0588000000-E	310	18" CS PIPE CULVERTS, 0.064" THICK	488 LF	57.12	27,874.56
0061	0594000000-E	310	24" CS PIPE CULVERTS, 0.064" THICK	64 LF	73.28	4,689.92
0062	0600000000-E	310	30" CS PIPE CULVERTS, 0.079" THICK	80 LF	89.17	7,133.60
0063	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (15", 0.064")	31 EA	592.81	18,377.11
0064	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (18", 0.064")	23 EA	645.86	14,854.78
0065	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (24", 0.064")	2 EA	673.98	1,347.96
0066	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (30", 0.079")	4 EA	940.03	3,760.12
0067	0636000000-E	310	*** CS PIPE ELBOWS, ***** THICK (36", 0.079")	2 EA	1,085.25	2,170.50
0068	0995000000-E	340	PIPE REMOVAL	11,448 LF	12.00	137,376.00
0069	1011000000-N	500	FINE GRADING	Lump Sum LS	2,008,869.00	2,008,869.00
0070	1044000000-E	501	LIME TREATED SOIL (SLURRY METHOD)	118,100 SY	2.65	312,965.00
0071	1066000000-E	501	LIME FOR LIME TREATED SOIL	1,420 TON	228.00	323,760.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0072	1099500000-E	505	SHALLOW UNDERCUT	750 CY	16.94	12,705.00
0073	1099700000-E	505	CLASS IV SUBGRADE STABILIZATION	2,200 TON	30.75	67,650.00
0074	1110000000-E	510	STABILIZER AGGREGATE	250 TON	37.37	9,342.50
0075	1115000000-E	SP	GEOTEXTILE FOR PAVEMENT STABILIZATION	62,000 SY	3.41	211,420.00
0076	1121000000-E	520	AGGREGATE BASE COURSE	6,710 TON	35.00	234,850.00
0077	1176000000-E	542	SOIL CEMENT BASE	118,100 SY	2.50	295,250.00
0078	1187000000-E	542	PORTLAND CEMENT FOR SOIL CEMENT BASE	3,310 TON	188.00	622,280.00
0079	1198000000-E	542	AGGREGATE FOR SOIL CEMENT BASE	2,320 TON	21.86	50,715.20
0080	1220000000-E	545	INCIDENTAL STONE BASE	5,000 TON	33.38	166,900.00
0081	1275000000-E	600	PRIME COAT	6,200 GAL	3.67	22,754.00
0082	1308000000-E	607	MILLING ASPHALT PAVEMENT, **** TO ***** (0" TO 3")	16,300 SY	3.60	58,680.00
0083	1330000000-E	607	INCIDENTAL MILLING	3,560 SY	9.10	32,396.00
0084	1491000000-E	610	ASPHALT CONC BASE COURSE, TYPE B25.0C	75,850 TON	48.50	3,678,725.00
0085	1503000000-E	610	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C	62,610 TON	48.50	3,036,585.00
0086	1519000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	8,740 TON	51.00	445,740.00
0087	1523000000-E	610	ASPHALT CONC SURFACE COURSE, TYPE S9.5C	59,810 TON	47.50	2,840,975.00
0088	1575000000-E	620	ASPHALT BINDER FOR PLANT MIX	10,595 TON	570.00	6,039,150.00
0089	1693000000-E	654	ASPHALT PLANT MIX, PAVEMENT REPAIR	3,200 TON	150.00	480,000.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0090	1869000000-E	710	***** PORT CEM CONC PAVEMENT, MISCELLANEOUS (WITHOUT DOWELS) (8")	470 SY	180.00	84,600.00
0091	2022000000-E	815	SUBDRAIN EXCAVATION	112 CY	26.97	3,020.64
0092	2033000000-E	815	SUBDRAIN FINE AGGREGATE	84 CY	54.47	4,575.48
0093	2044000000-E	815	6" PERFORATED SUBDRAIN PIPE	500 LF	5.11	2,555.00
0094	2070000000-N	815	SUBDRAIN PIPE OUTLET	1 EA	470.66	470.66
0095	2077000000-E	815	6" OUTLET PIPE	6 LF	12.71	76.26
0096	2099000000-E	816	SHOULDER DRAIN	30,330 LF	7.25	219,892.50
0097	2110000000-E	816	4" SHOULDER DRAIN PIPE	30,330 LF	1.25	37,912.50
0098	2121000000-E	816	4" OUTLET PIPE FOR SHOULDER DRAINS	2,550 LF	17.50	44,625.00
0099	2132000000-N	816	CONCRETE PAD FOR SHOULDER DRAIN PIPE OUTLET	70 EA	285.00	19,950.00
0100	2143000000-E	818	BLOTTING SAND	20 TON	48.17	963.40
0101	2209000000-E	838	ENDWALLS	61 CY	1,189.29	72,546.69
0102	2220000000-E	838	REINFORCED ENDWALLS	28 CY	1,250.00	35,000.00
0103	2253000000-E	840	PIPE COLLARS	2 CY	1,910.00	3,820.00
0104	2264000000-E	840	PIPE PLUGS	1 CY	2,485.00	2,485.00
0105	2275000000-E	SP	FLOWABLE FILL	124 CY	240.00	29,760.00
0106	2286000000-N	840	MASONRY DRAINAGE STRUCTURES	446 EA	2,700.00	1,204,200.00
0107	2297000000-E	840	MASONRY DRAINAGE STRUCTURES	6 CY	2,700.00	16,200.00
0108	2308000000-E	840	MASONRY DRAINAGE STRUCTURES	293 LF	390.00	114,270.00
0109	2364000000-N	840	FRAME WITH TWO GRATES, STD 840.16	23 EA	756.36	17,396.28

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0110	2364200000-N	840	FRAME WITH TWO GRATES, STD 840.20	59 EA	863.06	50,920.54
0111	2365000000-N	840	FRAME WITH TWO GRATES, STD 840.22	159 EA	696.57	110,754.63
0112	2366000000-N	840	FRAME WITH TWO GRATES, STD 840.24	10 EA	537.38	5,373.80
0113	2367000000-N	840	FRAME WITH TWO GRATES, STD 840.29	22 EA	614.32	13,515.04
0114	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)	13 EA	620.25	8,063.25
0115	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)	60 EA	652.21	39,132.60
0116	2374000000-N	840	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)	64 EA	684.17	43,786.88
0117	2396000000-N	840	FRAME WITH COVER, STD 840.54	11 EA	454.36	4,997.96
0118	2440000000-N	852	CONCRETE TRANSITIONAL SECTION FOR CATCH BASIN	17 EA	850.00	14,450.00
0119	2451000000-N	852	CONCRETE TRANSITIONAL SECTION FOR DROP INLET	42 EA	1,200.00	50,400.00
0120	2473000000-N	SP	GENERIC DRAINAGE ITEM SANDBAGS	210 EA	15.93	3,345.30
0121	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN #1	Lump Sum LS	65,000.00	65,000.00
0122	2474000000-N	SP	GENERIC DRAINAGE ITEM FILTRATION BASIN #2	Lump Sum LS	65,000.00	65,000.00
0123	2535000000-E	846	***X *** CONCRETE CURB (8" X 18")	335 LF	20.00	6,700.00
0124	2538000000-E	846	*** CONCRETE CURB & GUTTER (2'-0")	180 LF	20.00	3,600.00
0125	2542000000-E	846	1'-6" CONCRETE CURB & GUTTER	6,980 LF	17.00	118,660.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0126	2549000000-E	846	2'-6" CONCRETE CURB & GUTTER	20,350 LF	19.00	386,650.00
0127	2556000000-E	846	SHOULDER BERM GUTTER	5,270 LF	23.00	121,210.00
0128	2570000000-N	SP	MODIFIED CONCRETE FLUME	2 EA	1,600.00	3,200.00
0129	2591000000-E	848	4" CONCRETE SIDEWALK	7,840 SY	40.00	313,600.00
0130	2605000000-N	848	CONCRETE CURB RAMPS	70 EA	1,700.00	119,000.00
0131	2612000000-E	848	6" CONCRETE DRIVEWAY	2,240 SY	50.00	112,000.00
0132	2619000000-E	850	4" CONCRETE PAVED DITCH	33 SY	45.00	1,485.00
0133	2655000000-E	852	5" MONOLITHIC CONCRETE ISLANDS (KEYED IN)	11,050 SY	55.00	607,750.00
0134	2657000000-E	852	*** MONOLITHIC CONCRETE MEDIAN (****) (5", KEYED IN)	330 SY	58.00	19,140.00
0135	2759000000-N	SP	GENERIC PAVING ITEM PRECAST CONCRETE PARKING CURBS	17 EA	115.57	1,964.69
0136	2800000000-N	858	ADJUSTMENT OF CATCH BASINS	1 EA	1,408.53	1,408.53
0137	2830000000-N	858	ADJUSTMENT OF MANHOLES	51 EA	781.20	39,841.20
0138	2845000000-N	858	ADJUSTMENT OF METER BOXES OR VALVE BOXES	228 EA	268.69	61,261.32
0139	3030000000-E	862	STEEL BEAM GUARDRAIL	9,925 LF	16.00	158,800.00
0140	3045000000-E	862	STEEL BEAM GUARDRAIL, SHOP CURVED	200 LF	17.00	3,400.00
0141	3150000000-N	862	ADDITIONAL GUARDRAIL POSTS	25 EA	35.00	875.00
0142	3195000000-N	862	GUARDRAIL END UNITS, TYPE AT-1	2 EA	500.00	1,000.00
0143	3210000000-N	862	GUARDRAIL END UNITS, TYPE CAT-1	13 EA	600.00	7,800.00
0144	3287000000-N	SP	GUARDRAIL END UNITS, TYPE TL-3	37 EA	2,900.00	107,300.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0145	3288000000-N	SP	GUARDRAIL END UNITS, TYPE TL-2	2 EA	2,800.00	5,600.00
0146	3360000000-E	863	REMOVE EXISTING GUARDRAIL	2,175 LF	1.00	2,175.00
0147	3380000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL	10,775 LF	7.00	75,425.00
0148	3382000000-E	862	TEMPORARY STEEL BEAM GUARDRAIL (SHOP CURVED)	250 LF	7.00	1,750.00
0149	3389150000-N	SP	TEMPORARY GUARDRAIL END UNITS, TYPE ***** (TL-3)	40 EA	2,000.00	80,000.00
0150	3563000000-E	SP	TEMP *** WOVEN WIRE FENCE, COMPLETE W/POSTS (47")	7,000 LF	13.00	91,000.00
0151	3628000000-E	876	RIP RAP, CLASS I	5,900 TON	45.00	265,500.00
0152	3635000000-E	876	RIP RAP, CLASS II	50 TON	63.00	3,150.00
0153	3649000000-E	876	RIP RAP, CLASS B	3,470 TON	43.00	149,210.00
0154	3656000000-E	876	GEOTEXTILE FOR DRAINAGE	20,120 SY	1.85	37,222.00
0155	4048000000-E	902	REINFORCED CONCRETE SIGN FOUN- DATIONS	1 CY	10.00	10.00
0156	4054000000-E	902	PLAIN CONCRETE SIGN FOUNDA- TIONS	2 CY	10.00	20.00
0157	4060000000-E	903	SUPPORTS, BREAKAWAY STEEL BEAM	1,472 LB	7.00	10,304.00
0158	4066000000-E	903	SUPPORTS, SIMPLE STEEL BEAM	1,216 LB	6.00	7,296.00
0159	4072000000-E	903	SUPPORTS, 3-LB STEEL U-CHANNEL	7,085 LF	8.00	56,680.00
0160	4096000000-N	904	SIGN ERECTION, TYPE D	21 EA	125.00	2,625.00
0161	4102000000-N	904	SIGN ERECTION, TYPE E	336 EA	75.00	25,200.00
0162	4108000000-N	904	SIGN ERECTION, TYPE F	56 EA	125.00	7,000.00
0163	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (A)	6 EA	900.00	5,400.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0164	4110000000-N	904	SIGN ERECTION, TYPE *** (GROUND MOUNTED) (B)	3 EA	500.00	1,500.00
0165	4155000000-N	907	DISPOSAL OF SIGN SYSTEM, U- CHANNEL	209 EA	1.00	209.00
0166	4238000000-N	907	DISPOSAL OF SIGN, D, E OR F	9 EA	1.00	9.00
0167	4400000000-E	1110	WORK ZONE SIGNS (STATIONARY)	3,046 SF	10.00	30,460.00
0168	4405000000-E	1110	WORK ZONE SIGNS (PORTABLE)	1,701 SF	9.00	15,309.00
0169	4410000000-E	1110	WORK ZONE SIGNS (BARRICADE MOUNTED)	1,706 SF	9.00	15,354.00
0170	4415000000-N	1115	FLASHING ARROW BOARD	2 EA	4,985.72	9,971.44
0171	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2 EA	18,536.63	37,073.26
0172	4430000000-N	1130	DRUMS	2,000 EA	31.96	63,920.00
0173	4435000000-N	1135	CONES	300 EA	23.01	6,903.00
0174	4445000000-E	1145	BARRICADES (TYPE III)	1,168 LF	28.00	32,704.00
0175	4455000000-N	1150	FLAGGER	976 DAY	269.13	262,670.88
0176	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	20 EA	9,750.00	195,000.00
0177	4470000000-N	1160	REMOVE & RESET TEMPORARY CRASH CUSHION	9 EA	2,750.00	24,750.00
0178	4480000000-N	1165	TMA	2 EA	34,516.48	69,032.96
0179	4485000000-E	1170	PORTABLE CONCRETE BARRIER	4,410 LF	34.05	150,160.50
0180	4500000000-E	1170	REMOVE & RESET PORTABLE CONC- RETE BARRIER	2,860 LF	6.95	19,877.00
0181	4510000000-N	1190	LAW ENFORCEMENT	120 HR	50.00	6,000.00
0182	4516000000-N	1180	SKINNY DRUM	400 EA	38.35	15,340.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0183	4650000000-N	1251	TEMPORARY RAISED PAVEMENT MARKERS	3,847 EA	4.00	15,388.00
0184	4685000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)	193,643 LF	0.74	143,295.82
0185	4695000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)	29,927 LF	1.60	47,883.20
0186	4700000000-E	1205	THERMOPLASTIC PAVEMENT MARKING LINES (12", 90 MILS)	2,075 LF	3.00	6,225.00
0187	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)	4 EA	200.00	800.00
0188	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)	377 EA	85.00	32,045.00
0189	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)	5,317 LF	8.00	42,536.00
0190	4770000000-E	1205	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)	6,750 LF	3.00	20,250.00
0191	4810000000-E	1205	PAINT PAVEMENT MARKING LINES (4")	802,500 LF	0.18	144,450.00
0192	4820000000-E	1205	PAINT PAVEMENT MARKING LINES (8")	13,022 LF	0.50	6,511.00
0193	4825000000-E	1205	PAINT PAVEMENT MARKING LINES (12")	360 LF	1.00	360.00
0194	4835000000-E	1205	PAINT PAVEMENT MARKING LINES (24")	4,122 LF	2.00	8,244.00
0195	4840000000-N	1205	PAINT PAVEMENT MARKING CHARACTER	16 EA	75.00	1,200.00
0196	4845000000-N	1205	PAINT PAVEMENT MARKING SYMBOL	382 EA	25.00	9,550.00
0197	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (4")	90,916 LF	1.00	90,916.00
0198	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (8")	1,060 LF	2.00	2,120.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0199	4865000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (12")	45 LF	4.00	180.00
0200	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING LINES (24")	602 LF	6.00	3,612.00
0201	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	55 EA	100.00	5,500.00
0202	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM THERMOPLASTIC PAVEMENT MARKING LINES (24", 90 MILS)	740 LF	5.50	4,070.00
0203	4900000000-N	1251	PERMANENT RAISED PAVEMENT MARKERS	8 EA	15.00	120.00
0204	4905000000-N	1253	SNOWPLOWABLE PAVEMENT MARKERS	3,070 EA	52.00	159,640.00
0205	5325200000-E	1510	2" WATER LINE	1,378 LF	31.75	43,751.50
0206	5325600000-E	1510	6" WATER LINE	1,768 LF	64.58	114,177.44
0207	5325800000-E	1510	8" WATER LINE	3,922 LF	58.51	229,476.22
0208	5326000000-E	1510	10" WATER LINE	167 LF	82.78	13,824.26
0209	5326200000-E	1510	12" WATER LINE	39,165 LF	60.04	2,351,466.60
0210	5329000000-E	1510	DUCTILE IRON WATER PIPE FITTINGS	61,285 LB	8.25	505,601.25
0211	5536000000-E	1515	2" VALVE	6 EA	925.94	5,555.64
0212	5540000000-E	1515	6" VALVE	67 EA	5,214.33	349,360.11
0213	5546000000-E	1515	8" VALVE	34 EA	5,657.06	192,340.04
0214	5552000000-E	1515	10" VALVE	2 EA	22,357.55	44,715.10
0215	5558000000-E	1515	12" VALVE	76 EA	6,742.29	512,414.04
0216	5571600000-E	1515	6" TAPPING SLEEVE & VALVE	1 EA	5,355.00	5,355.00
0217	5571800000-E	1515	8" TAPPING SLEEVE & VALVE	4 EA	5,742.07	22,968.28

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0218	5572000000-E	1515	10" TAPPING SLEEVE & VALVE	1 EA	9,570.11	9,570.11
0219	5606000000-E	1515	2" BLOW OFF	3 EA	1,468.37	4,405.11
0220	5643000000-E	1515	*** WATER METER (1")	5 EA	1,404.45	7,022.25
0221	5643100000-E	1515	3/4" WATER METER	88 EA	1,020.93	89,841.84
0222	5643200000-E	1515	2" WATER METER	3 EA	2,874.60	8,623.80
0223	5648000000-N	1515	RELOCATE WATER METER	12 EA	509.57	6,114.84
0224	5649000000-N	1515	RECONNECT WATER METER	28 EA	509.58	14,268.24
0225	5656000000-E	1515	*** RPZ BACKFLOW PREVENTION ASSEMBLY (1")	3 EA	2,881.05	8,643.15
0226	5656000000-E	1515	*** RPZ BACKFLOW PREVENTION ASSEMBLY (3/4")	1 EA	2,435.40	2,435.40
0227	5656200000-E	1515	2" RPZ BACKFLOW PREVENTION ASSEMBLY	3 EA	4,511.89	13,535.67
0228	5666000000-N	1515	FIRE HYDRANT	29 EA	2,810.67	81,509.43
0229	5672000000-N	1515	RELOCATE FIRE HYDRANT	3 EA	2,810.68	8,432.04
0230	5673000000-E	1515	FIRE HYDRANT LEG	335 LF	29.57	9,905.95
0231	5686500000-E	1515	WATER SERVICE LINE	10,168 LF	32.88	334,323.84
0232	5691300000-E	1520	8" SANITARY GRAVITY SEWER	1,904 LF	99.55	189,543.20
0233	5691400000-E	1520	10" SANITARY GRAVITY SEWER	4,316 LF	90.41	390,209.56
0234	5691500000-E	1520	12" SANITARY GRAVITY SEWER	1,916 LF	121.97	233,694.52
0235	5709200000-E	1520	4" FORCE MAIN SEWER	1,319 LF	28.00	36,932.00
0236	5709600000-E	1520	12" FORCE MAIN SEWER	865 LF	135.81	117,475.65

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0237	5768000000-N	1520	SANITARY SEWER CLEAN-OUT	29 EA	577.38	16,744.02
0238	5768500000-E	1520	SEWER SERVICE LINE	1,993 LF	38.89	77,507.77
0239	5769000000-E	1520	DUCTILE IRON SEWER PIPE FITTINGS	4,085 LB	7.95	32,475.75
0240	5773000000-N	SP	UTILITY VAULT	1 EA	126,473.00	126,473.00
0241	5775000000-E	1525	4' DIA UTILITY MANHOLE	51 EA	3,883.22	198,044.22
0242	5781000000-E	1525	UTILITY MANHOLE WALL 4' DIA	189 LF	369.52	69,839.28
0243	5798000000-E	1530	ABANDON *** UTILITY PIPE (2")	655 LF	11.17	7,316.35
0244	5800000000-E	1530	ABANDON 6" UTILITY PIPE	1,345 LF	9.03	12,145.35
0245	5801000000-E	1530	ABANDON 8" UTILITY PIPE	9,129 LF	8.83	80,609.07
0246	5802000000-E	1530	ABANDON 10" UTILITY PIPE	4,082 LF	10.99	44,861.18
0247	5804000000-E	1530	ABANDON 12" UTILITY PIPE	36,003 LF	16.69	600,890.07
0248	5815000000-N	1530	REMOVE WATER METER	97 EA	413.70	40,128.90
0249	5815500000-N	1530	REMOVE FIRE HYDRANT	29 EA	413.70	11,997.30
0250	5828000000-N	1530	REMOVE UTILITY MANHOLE	36 EA	612.40	22,046.40
0251	5835700000-E	1540	16" ENCASEMENT PIPE	120 LF	58.00	6,960.00
0252	5835900000-E	1540	20" ENCASEMENT PIPE	40 LF	70.00	2,800.00
0253	5836000000-E	1540	24" ENCASEMENT PIPE	280 LF	97.00	27,160.00
0254	5872500000-E	1550	BORE AND JACK OF *** (16")	120 LF	711.41	85,369.20
0255	5872500000-E	1550	BORE AND JACK OF *** (20")	40 LF	793.41	31,736.40
0256	5872500000-E	1550	BORE AND JACK OF *** (24")	280 LF	788.10	220,668.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0257	5877000000-N	SP	SANITARY SEWER PUMP STATION	Lump Sum LS	452,500.00	452,500.00
0258	6000000000-E	1605	TEMPORARY SILT FENCE	182,000 LF	2.50	455,000.00
0259	6006000000-E	1610	STONE FOR EROSION CONTROL, CLASS A	4,550 TON	0.01	45.50
0260	6009000000-E	1610	STONE FOR EROSION CONTROL, CLASS B	18,100 TON	50.93	921,833.00
0261	6012000000-E	1610	SEDIMENT CONTROL STONE	38,000 TON	0.01	380.00
0262	6015000000-E	1615	TEMPORARY MULCHING	512.5 ACR	600.00	307,500.00
0263	6018000000-E	1620	SEED FOR TEMPORARY SEEDING	19,500 LB	2.00	39,000.00
0264	6021000000-E	1620	FERTILIZER FOR TEMPORARY SEED- ING	97.5 TON	850.00	82,875.00
0265	6024000000-E	1622	TEMPORARY SLOPE DRAINS	1,810 LF	13.02	23,566.20
0266	6029000000-E	SP	SAFETY FENCE	10,400 LF	2.50	26,000.00
0267	6030000000-E	1630	SILT EXCAVATION	30,930 CY	3.50	108,255.00
0268	6036000000-E	1631	MATTING FOR EROSION CONTROL	220,000 SY	1.35	297,000.00
0269	6037000000-E	SP	COIR FIBER MAT	100 SY	4.50	450.00
0270	6038000000-E	SP	PERMANENT SOIL REINFORCEMENT MAT	2,030 SY	5.50	11,165.00
0271	6042000000-E	1632	1/4" HARDWARE CLOTH	31,280 LF	8.00	250,240.00
0272	6045000000-E	SP	*** TEMPORARY PIPE (15")	36 LF	50.30	1,810.80
0273	6045000000-E	SP	*** TEMPORARY PIPE (18")	40 LF	62.73	2,509.20
0274	6045000000-E	SP	*** TEMPORARY PIPE (24")	1,320 LF	51.25	67,650.00
0275	6045000000-E	SP	*** TEMPORARY PIPE (30")	56 LF	77.55	4,342.80

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0276	6045000000-E	SP	*** TEMPORARY PIPE (36")	80 LF	68.89	5,511.20
0277	6045000000-E	SP	*** TEMPORARY PIPE (42")	134 LF	87.33	11,702.22
0278	6045000000-E	SP	*** TEMPORARY PIPE (48")	2,300 LF	88.65	203,895.00
0279	6045000000-E	SP	*** TEMPORARY PIPE (54")	40 LF	153.05	6,122.00
0280	6045000000-E	SP	*** TEMPORARY PIPE (60")	40 LF	175.72	7,028.80
0281	6046000000-E	1636	TEMPORARY PIPE FOR STREAM CROSSING	275 LF	73.55	20,226.25
0282	6048000000-E	SP	FLOATING TURBIDITY CURTAIN	1,670 SY	25.78	43,052.60
0283	6070000000-N	1639	SPECIAL STILLING BASINS	50 EA	439.89	21,994.50
0284	6071012000-E	SP	COIR FIBER WATTLE	3,700 LF	12.00	44,400.00
0285	6071014000-E	SP	COIR FIBER WATTLE BARRIER	530 LF	18.00	9,540.00
0286	6071020000-E	SP	POLYACRYLAMIDE (PAM)	3,300 LB	10.00	33,000.00
0287	6071030000-E	1640	COIR FIBER BAFFLE	2,000 LF	9.00	18,000.00
0288	6071050000-E	SP	*** SKIMMER (1-1/2")	51 EA	1,050.12	53,556.12
0289	6071050000-E	SP	*** SKIMMER (2")	6 EA	1,165.18	6,991.08
0290	6071050000-E	SP	*** SKIMMER (4")	1 EA	2,053.65	2,053.65
0291	6084000000-E	1660	SEEDING & MULCHING	273 ACR	1,600.00	436,800.00
0292	6087000000-E	1660	MOWING	321 ACR	85.00	27,285.00
0293	6090000000-E	1661	SEED FOR REPAIR SEEDING	5,200 LB	3.50	18,200.00
0294	6093000000-E	1661	FERTILIZER FOR REPAIR SEEDING	13.75 TON	950.00	13,062.50

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0295	6096000000-E	1662	SEED FOR SUPPLEMENTAL SEEDING	6,825 LB	3.50	23,887.50
0296	6108000000-E	1665	FERTILIZER TOPDRESSING	205 TON	750.00	153,750.00
0297	6111000000-E	SP	IMPERVIOUS DIKE	450 LF	68.24	30,708.00
0298	6114500000-N	1667	SPECIALIZED HAND MOWING	10 MHR	95.00	950.00
0299	6117000000-N	SP	RESPONSE FOR EROSION CONTROL	150 EA	250.00	37,500.00
0300	6117500000-N	SP	CONCRETE WASHOUT STRUCTURE	10 EA	1,212.16	12,121.60
0301	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE	8 EA	222.56	1,780.48
0302	6132000000-N	SP	GENERIC EROSION CONTROL ITEM FABRIC INSERT INLET PROTECTION DEVICE CLEANOUT	16 EA	222.56	3,560.96
0303	6141000000-E	SP	GENERIC EROSION CONTROL ITEM IMPERVIOUS PLASTIC	2,045 SY	4.96	10,143.20
0304	7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	8 EA	1,200.00	9,600.00
0305	7060000000-E	1705	SIGNAL CABLE	5,050 LF	4.50	22,725.00
0306	7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3 SECTION)	27 EA	750.00	20,250.00
0307	7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5 SECTION)	7 EA	1,050.00	7,350.00
0308	7252000000-E	1710	MESSENGER CABLE (1/4")	560 LF	3.50	1,960.00
0309	7264000000-E	1710	MESSENGER CABLE (3/8")	1,550 LF	4.25	6,587.50
0310	7300000000-E	1715	UNPAVED TRENCHING (***** (1, 2")	1,300 LF	7.00	9,100.00
0311	7300000000-E	1715	UNPAVED TRENCHING (***** (2, 2")	240 LF	7.80	1,872.00
0312	7300000000-E	1715	UNPAVED TRENCHING (***** (4, 2")	75 LF	10.00	750.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0313	7301000000-E	1715	DIRECTIONAL DRILL (*****)(1, 2")	170 LF	27.00	4,590.00
0314	7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	23 EA	300.00	6,900.00
0315	7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HEAVY DUTY)	3 EA	625.00	1,875.00
0316	7360000000-N	1720	WOOD POLE	2 EA	1,250.00	2,500.00
0317	7372000000-N	1721	GUY ASSEMBLY	8 EA	375.00	3,000.00
0318	7408000000-E	1722	1" RISER WITH WEATHERHEAD	1 EA	300.00	300.00
0319	7420000000-E	1722	2" RISER WITH WEATHERHEAD	2 EA	425.00	850.00
0320	7432000000-E	1722	2" RISER WITH HEAT SHRINK TUBING	1 EA	450.00	450.00
0321	7444000000-E	1725	INDUCTIVE LOOP SAWCUT	3,150 LF	5.65	17,797.50
0322	7456000000-E	1726	LEAD-IN CABLE (*****)(14-2)	10,700 LF	2.25	24,075.00
0323	7481000000-N	SP	SITE SURVEY	2 EA	1,500.00	3,000.00
0324	7481200000-N	SP	LUMINAIRE ARM FOR VIDEO SYSTEM	7 EA	800.00	5,600.00
0325	7481240000-N	SP	CAMERA WITHOUT INTERNAL LOOP EMULATOR PROCESSING UNIT	7 EA	2,800.00	19,600.00
0326	7481260000-N	SP	EXTERNAL LOOP EMULATOR PROCESSING UNIT	2 EA	6,250.00	12,500.00
0327	7481280000-N	SP	RELOCATE CAMERA SENSOR UNIT	8 EA	1,200.00	9,600.00
0328	7528000000-E	1730	DROP CABLE	600 LF	6.00	3,600.00
0329	7540000000-N	1731	SPLICE ENCLOSURE	1 EA	2,100.00	2,100.00
0330	7541000000-N	1731	MODIFY SPLICE ENCLOSURE	1 EA	1,800.00	1,800.00
0331	7552000000-N	1731	INTERCONNECT CENTER	1 EA	2,100.00	2,100.00

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0332	7576000000-N	SP	METAL STRAIN SIGNAL POLE	4 EA	11,500.00	46,000.00
0333	7613000000-N	SP	SOIL TEST	4 EA	950.00	3,800.00
0334	7614100000-E	SP	DRILLED PIER FOUNDATION	24 CY	850.00	20,400.00
0335	7636000000-N	1745	SIGN FOR SIGNALS	10 EA	500.00	5,000.00
0336	7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	8 EA	2,200.00	17,600.00
0337	7684000000-N	1750	SIGNAL CABINET FOUNDATION	1 EA	850.00	850.00
0338	7696000000-N	1751	CONTROLLERS WITH CABINET (*****) (2070E, BASE MOUNTED)	1 EA	15,000.00	15,000.00
0339	7744000000-N	1751	DETECTOR CARD (TYPE 170)	13 EA	125.00	1,625.00
0340	7901000000-N	1753	CABINET BASE EXTENDER	1 EA	375.00	375.00
0341	7990000000-E	SP	GENERIC SIGNAL ITEM BACK PULL FIBER OPTIC CABLE	200 LF	2.00	400.00
0360	1209000000-E	543	ASPHALT CURING SEAL	35,430 GAL	3.35	118,690.50

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0342	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (24+95.00 -Y2-)	Lump Sum LS	19,516.32	19,516.32
0343	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (305+27.00 -L-)	Lump Sum LS	58,000.00	58,000.00
0344	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (363+00.00 -L-)	Lump Sum LS	58,000.00	58,000.00
0345	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (38+76.00 -L-)	Lump Sum LS	19,507.96	19,507.96
0346	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (381+64.00 -L-)	Lump Sum LS	58,000.00	58,000.00
0347	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (53+01.00 -L-)	Lump Sum LS	20,130.43	20,130.43
0348	8056000000-N	402	REMOVAL OF EXISTING STRUCTURE AT STATION ***** (93+58.00 -L-)	Lump Sum LS	19,580.84	19,580.84
0349	8126000000-N	414	CULVERT EXCAVATION, STA ***** (24+95.00 -Y2-)	Lump Sum LS	15,770.77	15,770.77
0350	8126000000-N	414	CULVERT EXCAVATION, STA ***** (305+27.00 -L-)	Lump Sum LS	46,000.00	46,000.00
0351	8126000000-N	414	CULVERT EXCAVATION, STA ***** (363+00.00 -L-)	Lump Sum LS	46,000.00	46,000.00
0352	8126000000-N	414	CULVERT EXCAVATION, STA ***** (38+76.00 -L-)	Lump Sum LS	21,027.69	21,027.69
0353	8126000000-N	414	CULVERT EXCAVATION, STA ***** (381+64.00 -L-)	Lump Sum LS	46,000.00	46,000.00
0354	8126000000-N	414	CULVERT EXCAVATION, STA ***** (53+01.00 -L-)	Lump Sum LS	18,712.25	18,712.25
0355	8126000000-N	414	CULVERT EXCAVATION, STA ***** (93+58.00 -L-)	Lump Sum LS	15,593.94	15,593.94
0356	8133000000-E	414	FOUNDATION CONDITIONING MATER- IAL, BOX CULVERT	1,422 TON	50.13	71,284.86

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0357	8196000000-E	420	CLASS A CONCRETE (CULVERT)	2,349.6 CY	773.73	1,817,956.01
0358	8245000000-E	425	REINFORCING STEEL (CULVERT)	325,427 LB	1.57	510,920.39

Contract Item Sheets For C204181

Line #	ItemNumber	Sec #	Description	Quantity Unit	Unit Bid Price	Amount Bid
0359	8802040000-E	453	CIP GRAVITY RETAINING WALLS	380 SF	140.00	53,200.00
TOTAL AMOUNT OF BID FOR ENTIRE PROJECT						\$64,856,499.30

0740/Oct21/Q4392008.35/D1457268696000/E359

Contract No. C204181
County Stanly, Montgomery

Rev. 1-16-18

**EXECUTION OF CONTRACT
NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION**

CORPORATION

The Contractor declares (or certifies, verifies, or states) under penalty of perjury under the laws of the United States that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with this Contract, that the Contractor has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the Contractor intends to do the work with its own bonafide employees or subcontractors and did not bid for the benefit of another contractor.

By submitting this Execution of Contract, Non-Collusion and Debarment Certification, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF CONTRACTOR
Blythe Development Company

Full name of Corporation


1415 East Westinghouse Boulevard, Charlotte, NC 28273

Address as Prequalified

Attest


Secretary/Assistant Secretary
Select appropriate title

By


President/Vice President/Assistant Vice President
Select appropriate title

Luther J. Blythe Jr.

Print or type Signer's name

F.W. Blythe

Print or type Signer's name

CORPORATE SEAL



DEBARMENT CERTIFICATION

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation filed with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction*, *debarred*, *suspended*, *ineligible*, *lower tier covered transaction*, *participant*, *person*, *primary covered transaction*, *principal*, *proposal*, and *voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

Contract No. C204181

County (ies): Stanly, Montgomery

ACCEPTED BY THE
DEPARTMENT OF TRANSPORTATION

DocuSigned by:

Ronald E. Davenport, Jr.

F81B6038A47A442...

Contract Officer

10/25/2019

Date

Execution of Contract and Bonds
Approved as to Form:

DocuSigned by:

Colin Justice

1889E4C5ADF14AE...

Attorney General

10/25/2019

Date

Signature Sheet (Bid - Acceptance by Department)

Bond No. 018224451

Contract No. C204181
County Stanly, Montgomery

Rev 5-17-11

CONTRACT PAYMENT BOND

Date of Payment Bond Execution October 18, 2019

Name of Principal Contractor Blythe Development Company

Name of Surety: Liberty Mutual Insurance Company

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina

Amount of Bond: (\$64,856,499.30) Sixty Four Million Eight Hundred Fifty Six Thousand Four Hundred Ninety Nine Dollars and 30/100

Contract ID No.: C204181

County Name: Stanly, Montgomery

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

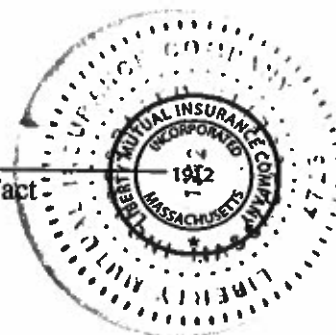
IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Rev 5-17-11

Affix Seal of Surety Company

By Donna K. Ashley
Print, stamp or type name of Attorney-in-Fact

Donna K. Chiles
Signature of Attorney-in-Fact




Signature of Witness

6100 Fairview Rd.

Charlotte, NC 28210

Address of Attorney-in-Fact

Contract No. C204181
County Stanly, Montgomery

Rev 5-17-11

CONTRACT PAYMENT BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

Blythe Development Company

Full name of Corporation

1415 East Westinghouse Boulevard, Charlotte, NC 28273

Address as prequalified

By

F. W. Blythe
Signature of ~~President, Vice President, Assistant Vice President~~
Select appropriate title

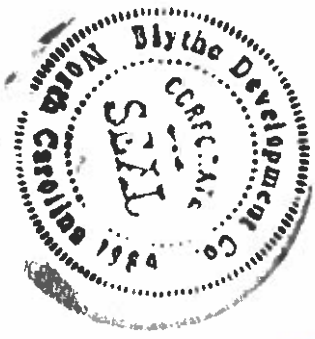
F. W. BLYTHE
Print or type Signer's name

Affix Corporate Seal

Attest

[Signature]
Signature of ~~Secretary, Assistant Secretary~~
Select appropriate title

Lothar J Blythe Jr.
Print or type Signer's name



Contract No. C204181
County Stanly, Montgomery

Bond No. 018224451

Rev 5-17-11

CONTRACT PERFORMANCE BOND

Date of Performance Bond Execution: October 18, 2019

Name of Principal Contractor: Blythe Development Company

Name of Surety: Liberty Mutual Insurance Company

Name of Contracting Body: North Carolina Department of Transportation
Raleigh, North Carolina

Amount of Bond: (\$64,856,499.30) Sixty Four Million Eight Hundred Fifty Six Thousand Four Hundred Ninety Nine Dollars and 30/100

Contract ID No.: C204181

County Name: Stanly, Montgomery

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL CONTRACTOR (hereafter, PRINCIPAL) and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the Contracting Body, numbered as shown above and hereto attached:

NOW THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bound parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Rev 5-17-11

Affix Seal of Surety Company

By Donna K. Ashley
Print, stamp or type name of Attorney-in-Fact

Donna K. Arley
Signature of Attorney-in-Fact



Angela Perry
Signature of Witness

6100 Fairview Rd.

Charlotte, NC 28210

Address of Attorney-in-Fact

Contract No. C204181
County Stanly, Montgomery

Rev 5-17-11

CONTRACT PERFORMANCE BOND

CORPORATION

SIGNATURE OF CONTRACTOR (Principal)

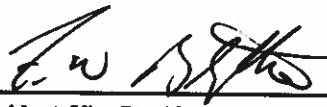
Blythe Development Company

Full name of Corporation

1415 East Westinghouse Boulevard, Charlotte, NC 28273

Address as prequalified

By

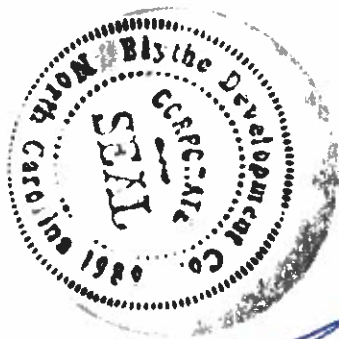


Signature of ~~President, Vice President, Assistant Vice President~~
Select appropriate title

F. W. BLYTHE

Print or type Signer's name

Affix Corporate Seal



Attest



Signature of ~~Secretary, Assistant Secretary~~
Select appropriate title

Luther J Blythe Jr.

Print or type Signer's name

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees. To confirm the validity of this Power of Attorney call 610-832-8240 between 9:00 am and 4:30 pm EST on any business day.



**Liberty
Mutual.**

SURETY

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint Donna K. Ashley of the city of Charlotte, state of NC its true and lawful attorney-in-fact, with full power and authority hereby conferred to sign, execute and acknowledge the following surety bond:

Principal Name: Blythe Development Company

Obligee Name: NC DOT

Surety Bond Number: 018224451

Bond Amount: See Bond Form

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 12th day of December, 2018.



The Ohio Casualty Insurance Company
Liberty Mutual Insurance Company
West American Insurance Company

By: David M. Carey

David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA
COUNTY OF MONTGOMERY

SS

On this 12th day of December, 2018, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: Teresa Pastella

Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS – Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts – SECTION 5. Surety Bonds and Undertakings. Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, of Liberty Mutual Insurance Company, The Ohio Casualty Insurance Company, and West American Insurance Company do hereby certify that this power of attorney executed by said Companies is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 18th day of October, 2018.



By: Renee C. Llewellyn

Renee C. Llewellyn, Assistant Secretary

